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F. A. BURCHARDT

PART I: RECOLLECTIONS OF HIS WORK IN GERMANY

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I first met Frank Burchardt, or Fritz Burchardt as he was then called, in the spring of 1925, when, at the age of 23, he joined my seminar in economic theory at Kiel University. By then he had almost completed his work for the *Doktor der Staatswissenschaften*, the equivalent of a Ph. D., with economics as a main subject. But this was only the last stage in a rather varied course of study. Before settling down to this work he had roamed freely for some years not only over several universities but also over several disciplines.

Originally Burchardt had been attracted by philosophy and, in particular, by logic and epistemology. This predilection for rigorous analysis, so characteristic of his own later work, drew him to Marburg, at that time the centre of neo-Kantian teaching. But the rarefied atmosphere of purely formalistic inquiry did not satisfy his deep concern for the social transformation which his country was undergoing after a lost war and an abortive revolution. He moved to Heidelberg, then almost the only German university where sociology, under the influence of the two Webers, had become a legitimate field of study. Yet it was only when he had been introduced to economic theory that he discovered a field that seemed to reconcile his analytical interests with the living issues to which he felt personally committed.

That Burchardt chose Kiel rather than Heidelberg for his economic training was in a way accidental. Since he found himself in straitened circumstances with the Great Inflation just reaching its climax, he had to look for financial support to continue his studies. Kiel University maintained one of the few student hostels which existed in Germany at that time. There, in the *Christian-Albrecht Haus*, among a small group of students exclusively chosen by merit, he lived for the next five years, later staying on as a senior member during his years of post-doctoral research.

This preference for life in a community centre is worth mentioning, because it was unusual in his generation. Burchardt had been prepared for it during his teens. There was no secondary school in the little town of Barneberg in the Prussian province of Saxony where he grew up. He was therefore sent to the *Kloster Unserer Lieben Frauen* in Madgeburg, a public school in the English sense, and as such a rare exception under the prevailing system of secondary education. It may well have been this long familiarity with communal living that eventually made Burchardt so easily adaptable to life and work in an ancient English university.

Burchardt's development as an economist and an academic teacher can be understood only in the context of the general condition of economics during these fateful inter-war years in Germany, and of the particular role which Kiel then played as a training centre. After a promising beginning in the early 19th century, economic theory had been overwhelmed in the German universities by several generations of ' historians ' and, later on, by social reformers. The ' Ricardians ', Thuenen, Rodbertus and, of course, Marx, had never held any academic post; and the ' marginal revolution ', which had conquered the Austrian universities by the end of last century, had attracted in the *Reich* only a few eccentrics. As late as the eve of the first World War one could study theory in the classical or neo-classical meaning of the term only with a few *Privatdozenten*, such as Franz Oppenheimer in Berlin or Emil Lederer in Heidelberg.

Several factors combined to change this picture during the twenties. The disastrous hyper-inflation was imputed, in part, to the failure of the responsible authorities in understanding the monetary mechanism. The debate on the feasibility of reparations was being conducted, in other countries, in terms of the theory of international trade; and it required—if only for foreign policy reasons—a rejoinder in similar terms. The domestic discussion on the nationalization of key industries ultimately revolved around the relative merits of free enterprise and central planning, an issue which was surely one for analytical thinking rather than for historical fact-finding. Thus a demand arose, both in government and business circles, for experts capable of handling such problems; and at least some university departments responded by attracting to their teaching staff younger men with a bent for analytical work. This was done, for instance, at Bonn, Frankfurt, Freiburg, and Heidelberg—and, above all, at Kiel with its renowned *Institut fuer Weltwirtschaft und Seeverkehr*.

There, under the paternal guidance of Bernhard Harms, the founder and head of the *Institut*, a training centre was established in political economy, with equal emphasis on theory and empirical research. During the years to follow a new generation of economists congregated at Kiel as teachers and investigators, among whom Gerhard Colm, Jakob Marschak, Wassily Leontief and Hans Neisser have achieved international reputations. Scores of students were attracted to this new academic focus, many of whom have since distinguished themselves as university men both inside and outside Germany. The great majority of them were to prove their moral fibre no less than their intellectual integrity by their staunch opposition to the Nazi regime, quite a few dying the death of political martyrs.

This gives some indication of the background of Burchardt's first productive period, as well as its opportunities. More important, the scientific and moral-political atmosphere that permeated the work and life of the Kiel centre during its first five years was to a very large extent of Burchardt's own creation. As chief research assistant and personal aide to myself in my capacity as research director, he was the link between the senior members and the research staff. His unusual theoretical gifts made him not only the trusted adviser of the younger members, but also an invigorating critic of the work of scholars who were far ahead of him in years and experience. There was hardly a publication of the *Institut* during these years which did not bear an acknowledgement of what the author owed to Burchardt's help.

Even more outstanding was his activity as a teacher. While Burchardt never held a formal teaching position during the whole of his time in Germany, there were few ' regulars ' of any rank who exerted a comparable influence on a highly select body of students. Acting on his own and without any established pattern, Burchardt developed a system of informal group tutorials. The *Institut*, with its spacious common rooms and beautiful grounds, was an ideal stage for conducting such an experiment. There Burchardt spent his weekdays and most of his Sundays, researching on his own in the morning, tutoring in the afternoon, and debating into the small hours of the morning with staff members and students on ' Gott und die Welt ', as the German saying goes. The range of topics was wide: they might equally well discuss Ricardo's theory of growth, the outlook for American prosperity, Karl Barth's interpretation of the Epistle to the Romans, or the pros and cons of the building of a new battle-cruiser. It is difficult at this distance to recapture the intellectual ferment and the sense of urgency that filled that epoch, when any objective, good or evil, seemed within the grasp of the daring, when any problem of which people were aware appeared soluble, and when few were troubled by the scepticism, doubt and disillusion which are so typical of the present age. The experience was unforgettable for those who were privileged to participate in this tremendous upsurge of energy; and it was not surprising that the idea of an 'Academy ' took a new lease of life.

At this time, Burchardt was quietly working on an ambitious research project. The overall topic of investigation with which the *Institut* was then concerned was the process of world industrialization in its relation to international business cycles. In order to interpret the mass of empirical material available, a theoretical model of ' cyclical growth ' was to be constructed, flexible enough to account for historical variations but of sufficient generality to serve as a basis for prediction. The task of developing this theoretical model was entrusted to Burchardt.

His dissertation on *Beitraege zum Problem der Statik bei Schumpeter* (Contributions to the Problem of Statics in Schumpeter) qualified him for such work in several respects. In selecting Schumpeter's theories (as presented in ' Nature and Content of Theoretical Economics ' and in the subsequent ' Theory of Economic Development '), Burchardt was subjecting to critical analysis the only rigorous model of the capitalist process that had so far been elaborated since Marx. He vigorously defended the logical consistency of Schumpeter's theory of market equilibrium—which is actually a restatement of Walras in non-mathematical language—against the misunderstandings of sociologically-minded critics. At the same time he showed that Schumpeter had not strictly adhered to his own methodological criteria, by wavering between a historical-descriptive concept of the stationary state and a formal model. Above all, he called into question Schumpeter's assertion that dynamics, understood as a theory of development or growth, was necessarily less ' exact ' than, and unrelated to, the theory of stationary equilibrium.

Burchardt's methodological position happily coincided with the basic working hypothesis on which the *Institut's* studies were founded, namely that a satisfactory explanation of industrial fluctuations must fit into the general framework of a theory of the economic circular flow. At the time this hypothesis, which the ' General Theory ' was to reduce to a commonplace ten years later, ran counter to prevailing fashions in theory. Since the phenomenon of the trade cycle seemed to be incompatible with the classical and neo-classical models of market equilibrium, its explanation was sought through the introduction of special assumptions quite unrelated to the general theory of value and distribution.

The exception to the ruling fashion was the monetary explanation of the trade cycle. In this instance, the distortion of market equilibrium was imputed to a factor which, because of its all-pervasiveness, was bound to implicate all the variables of the system in its own movement. What had to be demonstrated, however, was the systematic nature of the monetary fluctuations themselves. The study of this problem was Burchardt's first assignment, the results of which appeared as *Entwicklungsgeschichte der monetaeren Konjunkturtheorie* (Evolution of the Monetary Theory of the Trade Cycle, *Weltwirtschaftliches Archiv*, vol. 28, 1928, pp. 78–143).

After thirty years this monograph still stands out as a classic example of the way in which the history of an economic idea can be successfully combined with the study of its institutional background—and, above all, with the elaboration of its theoretical implications. The study began by tracing the monetary explanation of the business cycle back to its origin in the teaching of Hume, followed its development through the controversies of the Bullionists (and, subsequently, through the Currency and Banking Schools and Bimetallism), and concluded with a comprehensive discussion of the Wicksellian and post-Wicksellian position.

The principal value of the investigation lay, however, in its theoretical conclusions. In reply to Hawtrey's famous dictum that ' certain monetary and credit movements are necessary and sufficient conditions of the phenomena of the trade cycle ', Burchardt showed that, if Hawtrey's postulate is taken as a criterion, there simply is no monetary theory of the cycle. Sufficient though by no means necessary to explain price cycles, monetary and credit movements by themselves could not explain the cycles of production, employment and income. To do so, previous theorists had introduced, in addition to the monetary factor, numerous non-monetary factors such as physical bottlenecks, time lags, frictions due to error and irrational behaviour, and above all, the distortions consequent on technical changes. But while monetary factors were likely to intensify any disequilibrium caused by non-monetary causes, some of the latter themselves carried sufficient momentum to destabilize the equilibrium of the market, and had therefore to be given priority in a theoretical analysis.

On empirical grounds, the predominance among such non-monetary factors seemed, in the era of progressive industrialization, to lie with technical change. Moreover, whereas no one had succeeded in explaining monetary and credit movements as endogenous consequences of the real flow of production, it did not seem impossible to relate the introduction of technical improvements to typical market situations. Because of its characteristic technology the industrial system of production might well be afflicted with a sort of ' built-in ' instability; and this could be depicted in a model which, in addition to the traditional features, took account of systematic shifts in the production function.

It was along such lines that the theoretical discussions in the Kiel *Institut* moved during the later twenties. These discussions crystallized in a research programme which even the Keynesian Revolution has not made obsolete. The first step consisted in devising a model of the stationary flow that could be made amenable to dynamic transformation in the sense indicated. Neither Cambridge nor Lausanne, with their emphasis on price variables to the exclusion of the physical and technical aspects of the industrial market, offered a fruitful starting point. In order to arrive at an analytical replica of the economic process that incorporated both the value and the physical dimensions, it was necessary to go back to the earlier attempts at constructing a *tableau économique*, as manifested in the work of Quesnay, Marx and v. Boehm-Bawerk.

It was out of these investigations that Burchardt's second monograph evolved: *Die Schemata des stationaeren Kreislaufs bei Boehm-Bawerk und Marx* (The Models of the Stationary Circular Flow in Boehm-Bawerk and Marx, *Weltwirtschaftliches Archiv*, vol. 34, 1931, pp. 525–64, and vol. 35, 1932, pp. 116–76). The main results of this study have since been made available to the English reader in H. T. N. Gaitskell, ' Notes on the Period of Production ' (*Zeitschrift fuer Nationaloekonomie*, vol. 9, 1938, pp. 215–44); R. Nurkse, ' The Schematic Representation of the Structure of Production ' (Review of Economic Studies, vol. 2, 1935, pp. 232–44); and A. Lowe, 'A Structural Model of Production ' (Social Research, vol. 19, 1952, pp. 135–76); and they do not therefore require extensive presentation. As I see it, their lasting significance lies in three directions: as laying the foundation for a new theory of capital, as marking the initiation of input-output analysis; and as suggesting a frame of reference for a sectoral study of economic growth, equilibrating as well as disequilibrating.

As far as of capital theory is concerned, Burchardt's study is, at first sight, an attack on the ' linear ' model of the structure of production originally devised by V. Boehm-Bawerk. Indeed Burchardt demonstrates that the reproduction and expansion of the stock of fixed capital goods in a state of full resource-utilization cannot be explained by simply tracing the technical process of production back to some original combination of labour and natural resources. Though itself an output, such fixed capital can, in an industrial system, be maintained and increased only with the help of a circular process in which fixed capital goods also act as inputs. The Austrian model for that reason does not lose all significance for the theory of capital. If on the 'highest' stage a stock of fixed capital goods is added to the original inputs of labour and natural resources, the 'downward' flow to the final stage of finished output properly describes the structure of *working capital*. But to account for the presence and change of *fixed capital* the linear model needs be supplemented by the Marxian 'schema of reproduction' which depicts the self-reproduction of characteristic equipment goods.

This concept plays an important part to-day, in Leontief's description of the 'whirlpools' of intersectoral flows; but it was used long before this, by Alfred Kaehler in his *Die Theorie der Arbeiterfreisetzung durch die Maschine* (The Theory of Technological Unemployment, 1933) for an analysis of inter-industrial relationships. Though couched in arithmetical terms only, this study, written by another member of the Kiel circle in close association with Burchardt, contains to my knowledge the first attempt at input-output analysis, applied not only to stationary equilibrium but also to the intersectoral shifts required for capital formation.

With this the transition was made to genuine dynamic analysis, as had been the original intention. In his later *Habilitationsschrift* (qualifying thesis for admission to academic teaching), Burchardt himself supplemented his stationary model with an investigation of what are now called the sectoral conditions of once-over growth. Although political events prevented him from making the original draft of this work ready for publication, its indirect repercussions have been wide. My own research into real capital formation owes a good deal to the interchange of ideas that accompanied the preparation of this study, as does also, for example, Hans Neisser's work on monetary theory. Again, to mention a more recent outgrowth of these bygone discussions, a forthcoming publication by Murray Brown of the University of Pennsylvania will demonstrate the significance of the circular model of production for the understanding of the turn of a 'strong' boom. Altogether I have no doubt that, so far from being exhausted, the stimulation derived from Burchardt's theoretical thinking is likely to gather momentum in the years to come.

Notwithstanding the growing recognition of his work as a scholar and his activity as a teacher, Burchardt was becoming somewhat fretful by the late twenties. Exclusive concentration over many years on theoretical pursuits was making him feel an increasing need for some contact with the world of practice. He was fortunate in being offered in 1930 the post of personal secretary to one of the Directors of the *Berliner Handelsgesellschaft*, one of the leading private banks traditionally associated with major industrial concerns. There he spent a fruitful year of apprenticeship during the exciting months of the early depression in close touch with prominent figures of the world of business. In the end, however, this experience only confirmed his earlier conviction that for him this was alien territory, and that his mind and heart belonged to scholarship.

Hence I found it easy to persuade him in the following year to join me at the University of Frankfurt-am-Main as university assistant with the promise of early *Habilitierung*. Under the leadership of Kurt Riezler as Vice-Chancellor, Frankfurt was developing into a new centre of philosophical and social studies, and in the beginning it looked as if Burchardt had now reached personal as well as professional fulfilment. He was married to Arne Herren, whom he had met in Kiel, and who was to be a powerful moral support during the dark days to come. As a member of the research staff of the *Institut fuer Sozialforschung* and as the secretary to the joint seminars given by the Social Science and Humanities Faculties, he soon established a reputation as a social scientist far transcending narrow specialization. Again he became the untiring mentor of a large group of students, and tried to kindle the spirit of Kiel in the much more diffuse atmosphere of a big-city university.

His efforts met with a generous response: indeed, the seminar on the Origins of Liberalism, for the organization of which he was mainly responsible, is still remembered by participants now scattered over many countries. But the days of detached scholarship were running out. Soon the street mob was to invade the university, and the hour had struck for the minority of convinced liberals to stand up to be counted. Burchardt had for years been in their forefront, inside and outside the university—a stand that, in the end, cost him his academic future in Germany. His *Habilitierung* had been scheduled for the first week in February 1933. On January 30th Hitler came to power, and the cowardly Senate of the University cancelled his appointment.

Most of his friends and colleagues were soon compelled to leave the country; and more than one of them owes his safe departure to Burchardt's help, extended with utter disregard for his personal safety. I urged him to follow me to England. He declined with a self-deprecating smile, the smile so well-known to his friends, because he felt that, if he was not immediately exposed to danger, he could not compete for the available openings abroad with those who had no choice. He stayed behind for another two years, joining (as economic and financial editor) the staff of the Frankfurter Zeitung, which fought for a while at least, for economic sanity. I met him every summer in Switzerland, gathering from him at first hand the truth about the rising danger to humanity, and trying to persuade him to leave. Finally, in the summer of 1935, he admitted that his time had come if he was to preserve his integrity. It so happened that All Souls College had a research opening; and in the autumn the Burchardts, by now a family of three, moved to Oxford to start life afresh.

PART II: BURCHARDT'S WORK IN OXFORD

By G. D. N. WORSWICK

When, in 1935, Burchardt accepted the offer of a research grant by All Souls, he began what was to become a second academic career.

For the next twenty-three years Burchardt was to be closely associated with the Institute of Statistics, though he did not join its staff until the beginning of 1940. He arrived just at the time when the Oxford Economists' Research Group was being formed, with the purpose of promoting empirical research. Before the Second War broke out Burchardt was engaged, with Bretherton and Rutherford, in preparing, under the auspices of the Research Group, a big study of *Public Investment and the Trade Cycle*, which was finished in 1939, but not published, owing to war conditions, until 1941.

The Institute of Statistics had been started in 1936, with Jakob Marschak as Reader in Statistics and Director, with the purpose of promoting the subject of statistics in relation to social studies. When Burchardt joined the staff, as Librarian, in January 1940 there was considerable uncertainty as to what work should be done during the war. Many of those who had been working closely with the Institute left Oxford, either for the services or to take up appointments in the war-time administration. In the event it was decided to undertake research into problems of war-economics, and to include in this programme the collection and cataloguing of as much published economic material as was available. A cyclostyled ' Diary of Events ' was started and in the first instance this was circulated to a number of economists in Government depzrtments and elsewhere. This was the forerunner of the BULLETIN, which Burchardt was to edit for nearly twenty years. He did not, in fact, start it, for from June to November 1940 he was interned as an alien, and it was in this period that the decision to publish was taken by Ian Bowen, the first issue appearing as Volume 2 No. 8 in October 1940.[1] Burchardt returned to Oxford just as Bowen was leaving for the Ministry of Works, and he took over the editorship.

The BULLETIN constituted the main activity of the Institute during the first two years of the war. Marschak had resigned in September 1939 and Professor A. L. Bowley (as he then was) took up the post of Director, part-time, early in 1940, spending two or three days of each week in Oxford, coming over from his home in Haslemere. An almost wholly new staff was brought together in 1940 and 1941, mainly European economists who had been forced to leave their countries owing to the rise of fascism, or for whom the outbreak of war made it impossible to return: Kalecki from Poland, Balogh from Hungary, Mandelbaum, Moos, Schumacher and Miss Schulz, and Burchardt himself, from Germany; Forchheimer and Steindl from Austria; Goldmann from Czechoslovakia, were among those who, with a few English colleagues including Miss Ady, Nicholson and myself, formed an international research team.

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[1] The curious numbering of the first printed BULLETIN was necessary in order to secure paper. No paper could be obtained for *new* publications.

Professor Bowley was no mere figurehead. He showed a truly remarkable interest in the work of his younger colleagues and continued to carry out his own work in the field of wages and prices. With the aid of Miss Schulz, he started off a small and regular survey of working-class family budgets, and other studies of wages and the cost of a ' human needs ' diet. Nevertheless he was only able to be in Oxford part of the time, and the effective day-to-day running of the Institute was carried out by Burchardt. The war-time staff included several men of high intellectual calibre and varying temperament, and Burchardt began to show his unique flair for securing a high degree of co-operation and mutual aid. Some members of the staff did indeed have fairly well-defined fields in which they took the initiative: Kalecki's continuing studies of war finance and his associated theoretical studies of inflation and rationing; Balogh in problems of industrial mobilisation, and foreign trade and exchange policy; and, after 1941, some members working jointly with Nuffield College and Chatham House on problems of post-war European reconstruction. But most members of the staff found themselves shifted from one field to another as the economic problems of the war emerged and changed from month to month. Burchardt read everything, discussed every paper in meticulous detail, making suggestions for correction or improvement, and he more than anyone was constantly coming up with new ideas. He had no formal authority and he never tried to work that way. He had the ability to bring groups of people together to discuss a problem, to suggest a line of study, to get the work divided, and bring an article to publishable form in a very short time. Finance, inflation, manpower, production, consumption, rationing—these were the problems which were continually studied. Burchardt himself wrote about the shipping position, inter-allied economic co-operation, and fuel and power. As the war went on the emphasis of the Institute's work was gradually shifted towards problems of reconstruction, and Burchardt edited *The Economics of Full Employment* which was published in 1944. He wrote the opening chapter but, as always, did far more than that, reading all the drafts and discussing them point by point with the authors, or else organising small groups, ultimately securing a harmony of approach unusual in a book written by so many hands.

Professor Bowley retired for the second time in 1944, and Sir Hubert Henderson acted as Director until D. G. Champernowne was appointed Director in 1945, at which time also Burchardt's position was formally recognised by his appointment as Deputy Director. Once again the Institute was faced with a period of considerable uncertainty. During the war it had been housed in St. Catherine's Society, the New Bodleian, and Balliol College. In the next few years it was to move three times again, back to the New Bodleian, to 72 Woodstock Road, and then for a longish stay to war-time buildings which had been erected in the gardens of St. Hugh's College. Once more there was a big turnover of staff, many of the war-time staff leaving to take appointments elsewhere and new people coming in. Above all there was the question of finance and of the permanent status of the Institute. The Rockefeller Foundation had shown remarkable generosity in continuing to finance the Institute throughout the war, but it was their policy to launch enterprises; if they established themselves, they should then be taken over by the universities in which they were started. In the event the permanent financing of the Institute was taken over by the University. The time had now come also to work out a definite constitution for the Institute. It was decided to make the Institute a wholly University department, and statutes were drawn up and passed for this purpose. Housing, finance, and the recruitment of new staff inevitably took some time to settle, and they had barely been straightened out before Champernowne relinquished the directorship on his appointment as Professor of Statistics in December 1948, and Burchardt was appointed Director with the title of Reader in Economic and Social Statistics.

The first task he set himself was to draw up a plan of long-term research. His idea was to choose fields in which empirical studies might secure information interesting in itself, but also capable of throwing light on important aspects of economic theory. The first of these was savings. He launched a pilot survey, and then a series of regular sample surveys of incomes and savings. The theoretical stimulus of this enquiry was, of course, the role of the propensity to save in Keynesian theory, but he also had in mind that all British estimates of national savings hitherto made had been arrived at as residuals, and his hope was to obtain direct estimates of the magnitude and distribution of savings. From the beginning there was close co-operation with the Central Statistical Office and the Treasury. As this work developed the Institute gradually shifted from the collection of data to the econometric analysis of it. The second area of enquiry was investment. The pre-war Economists' Research Group enquiries had already cast some doubt on the importance of the rate of interest as a principal determinant of investment. But if interest changes were not the dominant influence, what were? Again Burchardt decided to proceed very cautiously and chose a few fields in which it was hoped that the main elements of capital investment would be limited in number and easy to describe physically, e.g. rolling stock and track on railways, buses of a municipal bus company, and so on. The idea was to investigate in the greatest possible detail the history of investment in these enterprises over a long period and to try to find those factors, technical, financial and so forth, which might explain the changes which had occurred. At a later stage this branch of the enquiry was pushed out into sample investigations of various aspects of the behaviour of small businesses.

The third field was that of wages and earnings. The enquiry was to be conducted at three levels: to analyse over long periods wages and earnings from national statistics, and, at the opposite extreme, a very detailed analysis of wages and earnings in single enterprises, with, in between, a study of wages and earnings in a single fairly homogeneous industry, namely, London Transport. Fourthly, a field in which Burchardt himself was probably most keenly interested personally, came an attempt to throw further light on the determinants of productivity changes, with emphasis placed once again on very detailed analyses of data obtained from a few firms producing as far as possible a homogeneous product.

These were the main headings of the research programme which he devised. There were, besides, other pieces of work undertaken at the Institute and there is no need to describe them. Much of the work has already been published in the BULLETIN, though some of it on the larger scale remains to be published in book form. Once the direction of enquiry had been charted, the actual course of the research was left to the interests of the individual researchers and the availability of finance (of decisive importance in survey work, which is very expensive). Very little of this work has been published over Burchardt's own name. He saw his task as one of facilitating and promoting research, and while in all the fields he engaged in continuous discussion and criticism of work in progress, he invariably left the credit for the final product to those of his staff who had been primarily engaged in the work.

As can well be imagined, a research programme on the scale he undertook, employing sometimes as many as 20 full-time researchers, entailed a great deal of administrative work inside the University as well as in seeking outside finance for various special projects and in securing the co-operation of economic agencies of various kinds. Within the Institute itself, although there is a formal grading of research officers, Burchardt never sought to impose any rigid hierarchical structure. He liked to keep the relations between the members of his staff as informal as possible, and he was constantly on the watch to see that no-one was employed on work to which he was unsuited or which he found uncongenial. He regarded the Institute not only as an instrument of research, but also as a training ground for future researchers. Always on the look-out for able young graduates, he did everything in his power, often at very considerable inconvenience to himself, to further their interests and their careers.

Burchardt had been associated with the Institute almost since its inception, and indeed it was his primary concern in all his years in Oxford; but he did also play a very active role in the Faculty of Social Studies, teaching, lecturing, conducting seminars and examining. During and immediately after the war he was almost continuously examining in P.P.E., a very heavy burden when added to his other duties. In the war years he had taken pupils from many colleges, and in 1946 he was appointed a Lecturer by Magdalen College and was elected a Fellow two years later. He used to say that he got great stimulus from tutorials and would not wish to give them up altogether, however great the pressure of other work. His pupils invariably spoke of his teaching with great enthusiasm. He was bubbling over with vitality, and while he could be persistent and even fierce in his questioning, he almost invariably succeeded in making a tutorial an interesting and exciting common study of a problem. In 1954 he was elected a Faculty Fellow of Nuffield College. He took a keen interest in the establishment of the new B.Phil. degree in economics, and he joined Sir Hubert Henderson and Sir Henry Clay in the seminar in applied economics, of which he remained continuously a member thereafter.

In 1952 he spent eight months in the United States as visiting professor in Stanford University, and in 1956–7 he worked in the Research and Planning Division of the Economic Commission for Europe, making a study of comparative recovery and development in east and west Germany and a major study of income distribution in western European countries. In the summer of 1955 he undertook for the European Productivity Agency a survey of the possibilities of research into investment behaviour in various European countries, and wrote a report on his findings.

He gave much of his spare time to the unobtrusive activities of G.E.R. in the rehabilitation of education in Germany after the war, and he was always available to advise and to lecture for the Delegacy of Extra-mural Studies in Oxford, being especially interested in questions of trade union education. He was elected a Governor of the National Institute of Economic and Social Research in 1952, and a member of the International Statistical Institute in 1954.

Of the European economists who came to this country in the 1930's others have acquired a wider renown. In his twenty years in Oxford Burchardt hardly ever wrote anything which appeared over his own name alone. When his name appeared at all it was usually in association with one or more of his colleagues. But it is arguable that his influence on academic economics will prove to be the most lasting. He began his academic life as a theoretician, and as Professor Lowe has pointed out, his early contributions to theory were outstanding. The frequency with which he used the word empirical in his later years might suggest that he turned against theory altogether. But this was not the case. He was sceptical of some kinds of pure theory, especially if they seemed to him to be the mere multiplication of empty boxes. But he was equally convinced that it was just as futile to conduct empirical investigations without the complement of an appropriate theoretical framework, or rather without setting up possible hypotheses to be tested.

He had that rare gift of statistical intuition, which enabled him to put a finger on a figure and say that it could not be right. His judgment in matters of economic policy was acute, yet moderate. He thought it would be improper for him to be at all closely involved in British politics; but he was keenly interested in economic policy both at home and abroad, and his opinion on any major policy question was always worth seeking. He was an excellent theorist, and despite the very heavy demands of administration he was remarkably well-informed about contemporary developments over a wide range of theoretical questions. But he was never content to stop short with analysis. ' What is to be done? ' was the question which was always in his mind. From time to time he would write an article on economic policy, but his greatest influence came through his stimulus to others. Whatever the topic he always came up with ideas and suggestions, which he offered freely and with an extraordinary modesty. It is hard to believe that he did not know how much he was giving to others, yet he was always reluctant to receive acknowledgement for his inspiration.

He sought British citizenship soon after he arrived, and, after the war-time delays, he received it in 1946. More than once he was asked to go back to Germany after the war. The temptation must have been great, for he undoubtedly enjoyed great prestige and influence and, had he done so, he could have lived a much easier and more comfortable life. But he was deeply absorbed in building up the Institute of Statistics, and in furthering the kind of research which he felt was most needed. And he had come to feel himself completely at home in Oxford, being especially delighted when first his son, and then the elder of his two daughters, became undergraduate members of his adopted university. He certainly regarded the absence of cafés as one of the greatest deficiencies of English life, but he found after-dinner conversation in college a fair substitute. Until his illness forced him, against his whole nature, to take things very quietly, he would work, talk and read unceasingly, and with never a trace of fatigue. The freshness of his mind, the inexhaustible willingness to give freely of his knowledge and wisdom, and the impish humour which salted it, will long be remembered.

PROFESSOR G. D. H. COLE, 1889–1959

It is with deep regret that we announce the death, in January of this year, of Douglas Cole. Any one aspect of his character and achievements —the rare quality of his mind and his extraordinary powers of application, his courageous involvement in the social issues of his time, and his innumerable contributions, both as author and teacher, to social history, political theory, economics, and sociology—would command admiration; together, they add up to greatness. The details of his life and work in so many fields must be recorded elsewhere; but he has a special place in the regard and affection of the members of the Institute of Statistics. He was a staunch friend of the Institute from its foundation: he served on its Standing Committee for many years, and inevitably came to be relied on in its counsels as its elder statesman. To the Institute, as to many other institutions and individuals, his loss is irreparable.

FINANCE OF THE NATIONALISED INDUSTRIES

By D. L. Munby

There has been a good deal of concern recently about the finance of the nationalised industries.[1] Many difficult issues are raised which need perhaps more discussion than they have provoked. But the purpose of this note is to suggest that this discussion would be more fruitful if it did not concentrate on *finance* merely, but considered *investment* also. Gross fixed capital formation by the nationalised industries (coal, gas, electricity, transport) is roughly of the same order of magnitude as the total for manufacturing industry, representing expenditure of some £900 millions in 1957. It would seem to be more important that these programmes should be soundly based than that the finance should be found according to some prescribed principle. If the use of resources is right, the method of financing is secondary. Unfortunately, there seems to be a danger of preoccupation with the financing aspect to such an extent as to endanger a proper investment programme. Without denying the importance of the financial aspect either in relation to fiscal or monetary policy as a whole, it would be disastrous if the narrow concerns of the Treasury should lead to the misuse of the nation's resources on a large scale. The evidence of the Treasury to the Select Committee on the Nationalised Industries (as also the evidence of the Ministries directly concerned) suggests a preoccupation with avoiding financing difficulties, and a (relative) lack of concern for the proper use of scarce capital resources. This false emphasis is perhaps encouraged by discussions of monetary and fiscal policy, such as Sir Roy Harrod's, which start from quite different concerns. This note tries to suggest ways of looking at the financing difficulties which will not preclude proper attention to the investment question.

I

As great users of capital in a world where capital is scarce, it is obviously of great importance that the nationalised industries should use it wisely. The mere volume of their investment schemes is no evidence of their prodigality, as has sometimes been suggested; these are industries where large blocks of capital must be employed, and where there is a secure, and often a large, return to sums invested. The danger is much more that large sums will be misused in some sectors whereas other sectors are starved of basic equipment. The contrast between electricity and transport has frequently been noted,[2] but even within a particular sector waste may occur, if proper criteria are not applied. Thus the North of Scotland Hydro-Electric Board was spending for many years more than was spent on new roads throughout the whole United Kingdom, and using this to build dams to last more or less for ever, which produced not very cheap electricity, with no regard at all to the importance of the rate of interest and no trace of economic reasoning in their plans.[1] Or again, it is not clear that the choice between coal and oil-fired power stations, or between thermal and nuclear stations, has been properly accounted for, or the choice between investment in roads, railways, and air services.

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[1] Roy Harrod, *Policy against Inflation*, pp. 186–95, 236–40; R. Kelf-Cohen, *Nationalisation in Britain*, ch. 10, pp. 281, 291, 293–4; *Reports from the Select Committee on Nationalised Industries* (*Reports and Accounts*) (H.C. 1956–7, No. 304; 1957–8, No. 187–1), especially evidence by Mr. A. T. K. Grant of the Treasury (*e.g.* First Report, qq. 8, 21, 24–26).

[2] Eg. R. F. Henderson, 'Industrial Investment in Fixed Capital: a Reconsideration,' *Scottish Journal of Political Economy*, Oct. 1956, p. 179.

This is not the place to go into these details. But a brief statement must be made about the appropriate criteria. In general, the consumer should pay prices that cover the current resources used up in the products or services in question. This involves depreciation charges at current, and not historical, costs. In the long run also the consumers must pay the appropriate capital charges, and investment schemes must be gauged by the appropriate rate of interest. The last point is more important than the preceding one; but it may be only by making consumers pay the going interest charges that the investment schemes can be properly gauged; otherwise investment schemes have to be based on estimates that consumers would be ready to buy at prices, which in fact they are not called on to pay.

In practice, in large sectors of this field, consumers have been paying prices that do not cover the use of current resources. Average cost pricing in coal has meant that about half the output is sold at a loss.[2] In electricity, the peak user does not pay for the costs he incurs; in transport, the traveller on branch lines, and stopping trains, and the season ticket holder do not pay for themselves. The fact that coal and electricity have usually had a financial surplus and transport a financial loss is irrelevant in this context. Proper pricing policies would lead to overall surpluses in coal (representing the greater productivity of intra-marginal pits, whose output cannot be increased quickly or at the same low cost); in electricity and transport, it would lead to some reductions of selected prices to offset rises elsewhere.

In addition, these industries have had cheap loans at gilt-edged rates. Have they been too low? There is no case for a general subsidy to the nationalised industries, and the consumer should certainly normally pay the going rate at which the industry borrows. The exception is where the capital has, in effect, lost its value. In this case, which is the railway case,[3] equity capital would be just written off; but, there being no equity, the Treasury should itself write it off. If the railway stockholders received in compensation sums that (with hindsight) we can see would never have been earned in the market-place, this is a loss the nation has suffered, but it is illogical to go on talking about ' railway losses ' (and then lending them further sums ' to pay for the losses '). From the economic point of view, what has happened is that the existing assets have become more or less worthless (they have ceased to earn a surplus over current costs), as has happened to some degree or other in most railway systems, and in particular in America. But from this nothing at all can be deduced about the return to new capital invested in the system, which could be large, because of the greater productivity of the combination of old assets and newly created ones.[1] Borrowing charges should therefore (except in this case) be levied on the consumer.

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[1] See ' Electricity in the North of Scotland ' *Scottish Journal of Political Economy*, Feb. 1956, and first report of the Select Committee. It may well be that the plans have been, in fact, justified, but it is not owing to the rational arguments of their proposers.

[2] See Select Committee (H.C. 1957–8, no. 187–1), op. cit., App. 21, p. 158.

[3] Or, at any rate, appears to be. It is assumed for the purposes of the argument here, without any attempt to prove it.

But this still leaves open the question as to the rate to be charged. If the nationalised industries can borrow at gilt-edged rates, there may be no need to charge the consumers more. But there is a strong case for making the investment programmes subject to a more rigorous scrutiny. When capital is scarce, why should there be one group of industries which merely look for a return of 4 to 5 per cent, while in the private sector firms expect something of the nature of 10 to 20 per cent before considering a project? When capital is genuinely plentiful, the matter may be different, but it can hardly be said that, either in the near past or the proximate future, this has been or will be, the case. There is, however, no reason why a monopoly should earn as high a return as a speculative, competitive industry, and the basic demand factors in the nationalised sector are easier to assess than in many other industries. For both these reasons, it is right that their investment should be subject to a less fierce test than in the case of the manufacturing sector, though one can easily be too optimistic about this (or too pessimistic), as has been clearly brought to light by the troubles of the railways and the coal industry. But, even granting this, it is hardly right that they should be allowed to embark on large-scale schemes with ultra-cheap finance, when these schemes are of the kind that are extremely sensitive to changes in interest rates. At the very least one would expect that the Treasury would have said to them ' We are lending you money (or, what comes to the same thing, allowed you to borrow on our credit) at 4½ per cent; but we would like to see what difference it would make to your plans if you have to borrow at 5 per cent, 7½ per cent, 10 per cent and 15 per cent. We will not approve them until we have satisfied ourselves that they will meet a more rigorous test than 4½ per cent.'[2] It is, however, clear from the evidence to the Select Committee that neither the Treasury, nor the Ministry of Power, nor the Scottish Office have asked these questions, though they have been aware that in some cases a mere rise in the rate of interest from 4½ per cent to 5 per cent would make serious differences.[3]

But if it is right that there should be a more rigorous examination of capital investment programmes than is afforded by the check of the current gilt-edged rate, and if there is no objection to the consumer paying more than this rate to allow for a reasonable return on capital (though this latter is not, indeed, essential), there is not a strong case for additional self-financing. It may be (as in the case of coal) that a proper pricing policy will automatically provide funds for self-financing. But in other cases it will not. What justification is there for raising the prices of electricity, or transport, above that required to pay for current resources employed and the use of capital at the going rate? Both the Herbert Committee on the Electricity Industry, and Professor R. S. Edwards (who sat on the committee), have argued against the proposal.[1] The Herbert Committee allowed for a reserve fund to meet short-run changes and provide for stability of tariffs, for which ' an annual average of, say, 1 per cent on the capital employed' would be ' no more than a modest provision '. But above this ' the industry should not build up reserves for financing its own expansion; to do so would be to impose a compulsory saving on present electricity users for the benefit of future consumers, and could possibly lead to the inefficient use of capital.'

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[1] Strictly speaking, the old assets could hardly then be regarded as worthless, except in terms of imperfections in the capital market, but these imperfections are a reality.

[2] Behind this lies the theoretical question as to what is the appropriate return for capital invested in the nationalised industries, taking account both of interest and a payment for risk and entrepreneurship. How should entrepreneurship in this sector be rated in comparison with the private sector? It is not clear that a straightforward answer can be given to this question, and certainly not here.

[3] ' Calculations made at a lower rate of interest may require a certain amount of recalculating and re-thinking about because it does affect the costs.' (Mr. A. T. K. Grant on the North of Scotland Hydro-Electric Board). ' We pay at gilt edged rate. . . . It is certainly relatively high at the moment and we feel it rather hardly, being of the order of 5 per cent.' (Mr. A. N. Ferrier, Chief Accountant, North of Scotland Hydro-Electric Board). (First report of the Select Committee, qq. 172, 346).

There is no exact parallel with the large self-financing programmes of private industry, because, in so far as competition does its work properly, the choice between self-finance and raising funds from the capital market is one about the surplus available to shareholders. In the case of a monopoly, we have the argument of the Monopolies Commission that the British Oxygen Company should not raise their prices in order to provide self-finance for expansion, but should go to the market for their funds.[2]

The case of iron and steel is rather ambiguous. The Iron and Steel Board started by fixing prices on the basis of average costs with depreciation at replacement costs, but with profits assessed on capital employed at written down original cost.[3] In the 1956 review account was taken of the ' capital and production costs which might be expected to be incurred at a new integrated plant incorporating the most modern techniques '. These estimated costs were used to modify the prices fixed according to the earlier system.[4] At the same time the Board state that ' their price policy is designed to take account of the need to provide out of earnings for the replacement of existing capacity and to allow of a further contribution towards the cost of expanding capacity. The extent to which expansion should be financed from retained earnings is a difficult question affecting all industry under the current circumstances of a restricted capital market and high levels of taxation. Whether the present price levels are adequate in this regard will continue to be the subject of close study '.[5] There seems to be some confusion in this discussion between basing prices on the costs of new plant (presumably interest and depreciation charges being calculated in the normal way) and fixing prices to allow for self-finance. Thus the special 1957 report on *Development in the Iron and Steel Industry* states that ' it is relevant that the Board's price policy pays regard to the capital as well as the operating costs at new plant and it should be possible for the companies to find a substantial part of the necessary finance from their own resources '.[1] The former policy is not unreasonable, and does in practice allow for some self-finance, though perhaps not as much as the industry itself would like.

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[1] Cmd. 9762 (1956), p. 146, and paras. 330–346; R. S. Edwards and H. Townsend, *Business Enterprise*, pp. 552–3, also 513–5. Professor Edwards is now a Deputy Chairman of the Electricity Council.

[2] H.C. 1956–7, no. 13 (*Report on the Supply of Certain Industrial and Medical Gases*), para 262 (majority report).

[3] 1953–4 Report (H.C. no. 138, 1955) paras 110–8.

[4] 1956 Report (H.C. no. 215, 1957), para. 91.

[5] *Ibid.*, para. 114. See also 1957 Report (H.C. no. 246, 1958), paras. 104 f.

It is somewhat odd to find Edwards and Townsend here arguing in favour of the opposite principles to those they wish to apply to electricity. Here they state that ' it seems very probable that the level to which profit margins are kept by price restriction in this industry is adversely affecting the rate of investment. High profits which would be earned in free market conditions would provide additional capital and the incentive to expand capacity. The more stringently prices are controlled the greater will be the problem of generating capacity.'[2]

The general case for self-finance assumes the imperfections of the capital market. But it is surely better policy to work for a greater perfection of the market in order that investment decisions may be as rational as possible. The logic of such a policy of trying to widen and improve the capital market, as is also implied in the recommendations of the Royal Commission on Taxation[3] on the abolition of the differential profits tax, involves, however, that the nationalised industries should be discouraged from self-finance, while being forced to pay proper capital charges. Artificially raised prices of coal, electricity and transport may at the moment seem so unlikely as to be Utopian, but it is as necessary to point out the dangers of such a policy in discouraging the use of basic services, as it is to point to the misuse of resources likely to result from too low prices. It is somewhat strange to find Sir Roy Harrod arguing on the one hand in favour of the self-selective process of a general credit squeeze in the private sector, while on the other hand arguing in favour of forcing up prices in the nationalised industries in order to provide for self-finance.[4] Such is the dilemma that results from looking at the financing of the nationalised industries apart from the problem of the rational use of scarce capital resources.

Before turning to the financing problem, let us look at the magnitude of the sums involved. In the five years from March 31st, 1953, to March 31st,

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[1] H.C. no. 214, 1957, para 200.

[2] *Op. cit.*, p. 456. The argument could perhaps be justified by the more competitive conditions in steel than electricity (but is the difference all that great?), or by an implicit judgment that the danger in steel is too little expansion and in electricity too much. The above quotation was written before the 1956 Report and the Development report were published, and therefore assumed the earlier pricing system, which may have been too low. Edwards and Townsend quote the later reports in a postscript, but do not comment on them. (pp. 462–4).

[3] Cmd. 9474, para. 536; Minority Report, para. 103.

[4] *Op. cit.* pp. 239–41. ' No one can judge so well as the head of a business himself whether the postponement of a given piece of capital outlay will do lasting damage to his firm's interests or can be endured without great harm.'

1958, gas, electricity and transport stock increased by £800 millions, and advances to the National Coal Board by £400 millions, while other advances from the Exchequer to these industries in 1956–7 and 1957–8 were about £600 millions. In all, finance had to be found in these five years for nearly £1,800 millions, or about £360 millions per year[1]; and with enlarged investment programmes, particularly in transport and atomic energy, borrowings by the nationalised industries may be expected to increase. By contrast the Local Loans Fund increased in the same period by £1,000 millions, and borrowings by New Towns by £150 millions, making a combined annual drain of £230 millions. At the same time, the total liabilities of the Exchequer increased by about £1,200 millions, £240 millions per year, the difference representing the effect of other operations, and in particular the budget surplus.

We must also look at these figures in relation to the receipts of the industries in question. How important are interest charges in relation to total receipts, and how important is the finance in question in relation to the same? The figures are given in the following table, with the finance figures taken both for the latest year (1957, or 1957–8), and for the average of the last five years. Finance is necessarily raised in lumps, and some averaging is reasonable, but, except in the case of the British Transport Commission, it does not make much difference. In the case of transport, the difference is accounted for by the very slow rate of capital formation in previous years and the present financial difficulties of the railways.

The results show the size of the finance problem in relation to total receipts. If all finance were to be found internally, and making the rough and ready assumption of an inelastic demand, electricity charges would have to be increased by more than a quarter in England and Wales, and by about three-fifths in Scotland, coal prices would rise by rather less than 10 per cent and gas prices by 10 per cent or more. In the case of transport, the figure must lie somewhere between 10 and 20 per cent, on the assumption that the 1957 losses on current account would not normally occur. The figures also show that Harrod's rough justice, of relieving these industries of existing interest payments,[2] would still leave serious price increases to pay for the remaining self-finance: 15—20 per cent in the case of English and Welsh electricity, 35—40 per cent. for Scottish electricity, 5 per cent for coal, perhaps 5 per cent for gas, and perhaps 10 per cent for transport. The distortions to the price system are surely serious enough to suggest that other methods of finance must be found.

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[1] These figures exclude the airlines, and other nationalised industries, but include all the investment giants.

[2] *Op. cit.*, pp. 238–9. Our figure for interest works out at nearly £170 millions in contrast to Harrod's £130 million, but the amount will have increased over the years.

TABLE

	1957		1957–8		1957		1957–8		1957	
	B.T.C. £m	*Per Cent.*	*C.E.A.* £m	*Per Cent.*	*Scottish Electricity* £m	*Per Cent.*	*Gas* £m	*Per Cent.*	*Coal* £m	*Per Cent.*
1 Total Receipts	768	100	474	100	46	100	322	100	937	100
2 Interest charges	52	7	54	11	11	23	23	7	26	3
3 Finance raised (5 yrs. avrge.)	66	9	139	29	27	58	43	13	77	8
4 Finance less Interest ...	13	2	85	18	16	35	20	6	51	5
5 Finance 1957, or 1957–8 ...	156	20	123	26	29	63	32	10	81	9
6 Do. less Interest	103	13	69	15	19	40	9	3	55	6

Total receipts and interest charges are taken from the industry's accounts. Receipts include all sales, not merely main products.

Finance raised. Average of 5 years ending March 31st, 1958, taken from *Annual Abstract of Statistics*, no. 95, 1958 Tables 302–3, giving net increase in Exchequer advances to National Coal Board, and stocks of the other nationalised boards. Exchequer advances to the other boards for 1956–7 and 1957–8 taken from *Capital Investment in the Coal, Gas and Electricity Industries* (Cmnd. 132, 1957, and Cmnd. 415, 1958), and reports of British Transport Commission(figures for Calendar years).

II

In the initial stages the nationalised industries borrowed from the banks and on the government's credit, with the exception of the coal industry, which always borrowed directly from the Exchequer, and, partly as a result of this, was much more closely controlled by the Ministry and the Treasury.[1] The others would borrow from the banks until the time came to float a loan on the market, which was, in effect, government stock. The awkwardness of this competition with the Treasury's own borrowing led to the 1956 change-over to the system by which the Treasury found all the required finance above the level of ' normal short-term needs ' provided by bank overdrafts.[2] The change meant that, instead of the Treasury having to support the loans made by the nationalised industries themselves, in order to avoid the loss of ' Government credit ', it could conduct all its operations in the short and long markets according to its own timetable. This is a minor technical change in relation to the real issue, which is ' that the government was so large a *net borrower* '.[3] Unavoidably, if the nationalised industries borrow large sums to pay for their net investment schemes on government credit, this must be so, if there is not a large budget surplus. And if, in addition, the Treasury cannot sell sufficient long-dated stock to take account of this borrowing, it must increase the volume of Treasury Bills, and create all the problems of excessive liquidity in the banking system. *Hinc illae lacrimae.*

The nationalised industries can finance their inevitably large capital investment programmes in a variety of ways:

(*a*) by raising prices above what would otherwise be justifiable (self-finance),
(*b*) by means of bank advances,
(*c*) by short-term Government borrowing,
(*d*) by long-term Government borrowing,
(*e*) by their own loans on the market, and
(*f*) through a budget surplus.

The theory has been that they should follow courses (*b*) and (*d*), but the state of the gilt-edged market has in effect often resulted in (*c*). (It does not really make much difference that in the early stages this resulted from the Departments taking up their loans, or other long-term Government stock, to prevent the market's collapse, and that, more recently, the Treasury has been forced directly to borrow on Treasury Bills in order to re-lend it to them).

Harrod recommends (*a*) in order to avoid the pressure on the Government's short-term operations. But we want to rule this out in order not to interfere with a rational investment policy. What can we do? For the purposes of this argument we must assume that it is desired, on general monetary grounds, to restrict the volume of borrowing on Treasury Bills, in order to maintain control of the banking system.[1] We are then left with alternatives (*b*), (*d*), (*e*) and (*f*).

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[1] Second report of Select Committee, qq. 31, 617, 638–9.
[2] Cmnd. 132, para 28.
[3] Harrod, *op. cit.*, p. 186; see also p. 237.

What about (*b*) bank overdrafts? The size of the sums in question would rule this out as a solution, even were it acceptable on other grounds. With bank advances at about £2,000 millions, an annual demand for £350—400 millions would hardly be possible, though perhaps more might be done than at present.[2] There seems no reason in principle to cut down bank advances to the nationalised industries to a limited sum, as seems to have been Treasury policy, and, as both Sir Roy Harrod and Professor Paish have argued, it is a less inflationary method of borrowing than Treasury Bills, because of the secondary effects of the latter via the liquidity ratio.[3] But, even if some relief may be found this way sometimes, it is not by itself enough.

Why should we not opt for alternative (*f*), a budget surplus? It can reasonably be argued that the public, as owners of the nationalised industries, should pay as taxpayers for the savings, which, though necessary, they are apparently unwilling to make as savers. It is not clear why it is ' intolerable ' that the taxpayer should have to contribute, while it is acceptable that the consumer should.[4] Contributions by the taxpayer (unless they involve heavy indirect taxes) would involve less distortions in the use of resources, according to the orthodox arguments (which it is not the place to discuss here). But, even though the principle may be unobjectionable, the practice may be difficult. The size of the budget surplus should be related to the savings forthcoming and the overall economic situation, and not to the difficulties of floating government stock (see below). It may well be that the size of the surplus, as determined by general economic conditions, is not the same as that required to avoid the Treasury's difficulties. Admittedly, in times of deep slump, if a large deficit were required, there would not be the liquidity objections to financing by means of Treasury Bills. But there may well be intermediate situations where only a small surplus is required, or none at all, and yet where borrowing by the nationalised industries could cause rates on government stock to rise fairly severely.[5]

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[1] Personally, I would argue that, though the control of the total quanity of money (total deposits in this context) is the appropriate aim of banking policy, there is no reason why a varied second liquidity ratio should not be used. This is not the same as a limit to advances (which is a less desirable and more selective policy), as seems to be assumed by Harrod (*op. cit.* pp. 182–4), where the banks' ' Investments ' seem to be ignored. The advantage of the use of the second liquidity ratio is that it is possible to increase the banks' holdings of one kind of asset (Government short-term borrowing) without increasing the total of deposits by any greater amount, which is not possible where a fixed percentage is maintained. But if this argument is not accepted (and there could still be difficulties with the nationalised industries' borrowing), we must face other alternatives. We cannot assume that it will be acceptable.

[2] Advances to public utilities and transport were under £80 millions in 1957, and varied between £100 and £140 millions in 1952–6, with the exception of 1955, when they were as high as £184 millions. Bank advances are negligible in coal mining. It may be argued that these industries do not require as much working capital in proportion to fixed capital as, for example, manufacturing industry with its bank advances running at about £600 millions. (*Annual Abstract of Statistics* and *Economic Trends*).

[3] Harrod, *op. cit.*, pp. 187–9, 238. F. W. Paish in *London and Cambridge Economic Bulletin*, Sept., 1956, p. vii.

[4] Harrod, *op. cit.*, p. 238.

[5] *Ibid.*, pp. 193–4.

Why then should the nationalised industries not borrow on the Exchequer's credit (method (*d*)), in the way they have done hitherto? The simple free market argument would be that if the volume of government stock has been increased in relation to the public demand for it, then the price should be adjusted. There is no law of nature that ensures a certain spread of yields as between equivalent government stocks and equities or private debentures. Why not allow the market to have its way, even if it means higher interest charges on the budget and high costs for the investment programmes of the nationalised industries?

The dilemma arises from the size of the demands for capital from the nationalised industries, which, as we have seen, invest in real terms about as much as the whole of manufacturing industry, and require £350—400 millions of finance per year. Nationalisation, with the abolition of the equity, has meant a large addition to the total of gilt-edged coming on to the market, and a corresponding diminution of the quantity of ordinary shares.[1] This has at times created problems when the public has not been willing to acquire stock in these proportions so as to maintain the rate of gilt-edged at a level that the Government thought suitable. This is the basic dilemma.[2] It does not really matter that there may have been an artificial flight from gilt-edged, as a result of inflation and fears of further inflation, whether false or not. The dilemma can always return in the future. There is indeed no reason to suppose that the public's preferences will always remain in the correct proportions, even if they do for a short time. Indeed, in the long-run, with the dying-out of the rich holders of the ordinary shares, there are many reasons why it may be desirable to persuade more people, who would be inclined on the basis of past traditions to invest in ' safe ' securities, to turn to ordinary shares. This may well happen and could aggravate the problem.

The logical result of these changes would be that the rate on gilt-edged would be permanently higher than in the past. There seem to be two relevant arguments against allowing this to happen: (1) ' The credit of the country ';[3] (2) The cost of dear money. (1) It might be argued that the public who judge the credit of the country or the ' credit of the British government ', should adjust their ideas to a new situation. There also seems to be some confusion about the use of the word ' government ' in a world where governmental activities are widespread, multiform and not always directly controlled by the gentlemen in Whitehall. This leads on to the question of raising money directly from the market for the nationalised industries, without implicating ' the government.' (2) High interest charges should certainly be avoided for the usual budgetary reasons. But if they are the direct result of the extra borrowing by the nationalised industries, why should these industries not themselves pay the price? The argument is that, because these borrowings are such a large part of the total, the marginal cost of borrowing is much greater than the rate at which borrowing takes place. Why should not the nationalised industries pay the marginal cost? We have argued that the Treasury should in any case use a rate higher than the market rate on gilt-edged for assessing investment programmes, so that there is no objection to the higher charges on these grounds. The difficulty would be for the Treasury to calculate the extra burden on the Exchequer that should form the basis of the tax.[1]

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[1] The additions to the stock of money capital in the public and private sectors are likely to be roughly equal. Compare an average of £355 millions for new industrial issues during the five years 1953–7 (including the nationalised industries in the earlier years), and £467 millions for all new issues, excluding gilt-edged. (*Annual Abstract of Statistics*).

[2] Harrod, *op. cit.*, pp. 190–1.

[3] Harrod, *op. cit.*, pp. 185–6.

This leads on to the final alternative (*e*), that the nationalised industries should borrow on the market. The Herbert committee argued in favour of this alternative, so long as it was applied to all the nationalised industries.[2] In a sense this may be more of a psychological, than a real, change, but not unimportant in so far as ' the credit of the government ' ceases to be involved. The market seems ready to assess local government and semi-governmental issues at a different rate to that of the Treasury, and to regard them as inferior. It is difficult to see that there is much difference in security, that for example any government would allow investors in British Transport Stock to lose their money, even if there were no direct Treasury guarantee. The pre-war scheme of a semi-equity in the London Passenger Transport Board, with its provision for putting the Board into the hands of a receiver, is clearly unrealistic. But, if in fact the market puts a different value on the stock of the British Government and the stock of the local authorities or the nationalised industries, then the difficulties in the gilt-edged market should be overcome, at least to some extent.[3] It is at least strange that, in 1956, the Government should at the same time have forced the nationalised industries out of the market and forced local authorities into it. The logical policy would seem to have been to have loosened the link between gilt-edged and the stock of the nationalised industries. Thus also argues Mr. Kelf-Cohen.[4]

III

We have argued the case at its worst. In practice, a proper pricing policy would provide a considerable amount of self-finance, but certainly not enough to cover all the needs of these inevitably vast investment programmes. If it is accepted that the most important need is for proper criteria for investment and proper pricing policies for these industries, the financing problem cannot be entirely solved by means of self-finance. Of the other alternatives, perhaps more can be done by means of bank advances, and through the budget surplus; there is, after all, no reason why only one method of finance should be used. Over and above these sources of finance, if it is still thought that the Treasury will have to suffer undesirable difficulties in floating the amount of stock required, the best solution would seem to be to free the nationalised industries from their close dependence on the Treasury, though it should also be possible as an alternative to charge them more than gilt-edged rate to make up for the Treasury's losses. Above all, the financing problem must be seen together with the pricing and investment problems, and not as a separate issue, to be treated regardless of its effects on the use of resources, as the Treasury may be tempted to treat it.

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[1] One has to compare £170 odd millions of interest paid by the major nationalised industries with total interest on the national debt running between £500 and £600 million.

One major difficulty is the case of housing, where there may be strong reasons for a cheap money policy.

[2] *Op. cit.*, paras. 348–51.

[3] All this requires much closer examination. One possibility, suggested to me by Sir Roy Harrod, is the issue of preference shares.

[4] *Op. cit.*, pp. 187–9, 193–4, 281. He applies it mainly to electricity, and thinks it impossible in the case of transport. (We ignore here the peculiar difficulties of transport.) He also wants more self-financing, and refers to pricing policy (p. 185), but the discussion is quite inadequate. Mr. J. L. Carr in a letter to the *Times* (December 22nd, 1958) also advocates this policy.

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THE GROWTH OF MANUFACTURING FIRMS

By H. F. LYDALL

This article is one of a series dealing with the results of the 1956 survey of small and medium-sized manufacturing businesses. It is based on interviews with 876 firms employing between 10 and 499 persons. The sample was drawn from 10 main industrial areas in Great Britain, in which are to be found between a fifth and a quarter firms in this size range. Details of the sampling methods used and a discussion of the validity of the sample can be found in the first article in the series;[1] and some general information about the characteristics of the firms interviewed was given in the article which appeared in an earlier issue of this BULLETIN.[2] In the present article attention is turned to problems connected with the growth of firms.

INTRODUCTION

On a national or international scale growth means an increase in real output per head. It is brought about partly by technical invention, partly by improved organisation and wider use of existing techniques, and partly by an increase in the capital equipment at the disposal of society. This is reasonably clear when stated in such general terms. But it is not clear what relation exists, or may exist, between the growth of the economy as a whole—or of a particular industry—and the growth of individual firms. Does a growing industry necessarily imply growth in the output of each constituent firm, or at least of the average or ' representative ' firm in that industry?

It is conceivable that a situation might exist in which an industry's output grew solely by a multiplication of firms, each of similar size. This is most likely to occur, in a highly developed country, in the service trades, when some kind of service is increasing in popularity and is spreading geographically through the economy. In such cases the optimum size of the establishment is determined very largely by the distribution of the population and the distance which people are prepared to travel in order to obtain the service in question. In manufacturing industry the growth of an industry by the multiplication of firms can occur at an early stage in a country's development —when the main thing is the lateral spread of a new technique, such as mechanical cotton spinning—but it is less likely to occur in the later stages of industrialisation, when well-established and progressive firms exist in almost every branch of industry. At this point changes in public taste or improvements in productive technique are more likely to be met by an adaptation of existing firms than by the entry of new firms into the industry. The reasons are not far to seek. The growth in the average size of firms and in the minimum sum of capital required for establishing a viable new firm combine to reduce the supply of potential new entrants and to increase the obstacles in their way. At the same time, the larger businesses already in existence develop a wider and more flexible approach to industry which, together with the considerable sums of capital at their disposal, enables them to take on new kinds of work, change their designs, markets or techniques, and so very largely forestall the development of new firms to fill the new needs.

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[1] H. F. Lydall, ' The Impact of the Credit Squeeze on Small and Medium-Sized Manufacturing Firms ', *Economic Journal*, September, 1957.

[2] H. F. Lydall, 'Aspects of Competition in Manufacturing Industry ', BULLETIN, November, 1958.

The ' optimum ' firm has been defined as ' that firm which in existing conditions of technique and organising ability has the lowest average cost of production per unit, when all those costs which must be covered in the long run are included.'[1] The assumption underlying this definition is that, under any given conditions of technique, there is a size beyond which average costs —even long-run costs—begin to rise; if this were not so, then there would be no limit to the cost advantages which could be gained by increasing the size of the firm. The concept has practical significance, however, only if we assume that market conditions are such as to push firms in the direction of the optimum. If we assume perfect competition in both the product and factor markets—and, incidentally, that each firm produces only one product—then all firms making the same product will necessarily be of the optimum size; and, so long as the same technical conditions obtain, the total output of that product will increase in the long run only by an increase in the number of firms of optimum size. Changes in technical knowledge will, of course, cause changes in the volume of output per firm; but so long as perfect competition exists these technical changes merely shift the standard size of firm —in terms of output—from one point on the scale to another.

In practice, of course, there are no such conditions of perfection in the markets for products of manufacturing industry, nor in the markets for the factors of production employed. Moreover, there is scarcely a firm in existence which produces only one product. Hence, the most that can he said for the concept of the optimum firm is that it provides a point of attraction toward which firms tend to move in the long run. Unfortunately, this process is so much retarded by the various frictions and imperfections which hamper the movement of resources that the distribution of firms by size in any industry at any one moment of time is generally widely scattered. Moreover, since the majority of firms are below the optimum size, they are continually trying to expand when market conditions are favourable. It should not surprise us, therefore, to find that in a period of reasonable prosperity the majority of firms in existence have increased their output and desire to increase it still further.

The Questions to be Discussed

The real test of the adequacy of economic policy in this field is not whether firms grow—most of them will do this anyway—but whether they grow fast enough. The sorts of questions to which one would like to have answers are these: Are technically backward firms, or firms too small to attain optimum costs, moving forward and adopting more advanced technical methods? Are they increasing to the optimum size? Are they raising the level of their organisation up to the standards achieved by the best firms in the industry? And if not, why not? These questions, which are concerned with the speed of *application* of existing techniques, can to some extent be answered by means of a survey such as this. There are other equally important questions—perhaps they are of much greater long-term importance—concerning the speed with which new industrial techniques are being developed and of the economic arrangements which favour rapid technical development. These are questions which we have not attempted to answer, except in the most general terms.

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[1] E. A. G. Robinson, *The Structure of Competitive Industry*, 1935, Cambridge University Press, p. 15.

Even in the field of technical application the results of this survey take us only a small part of the way towards an understanding of the processes at work. Nevertheless, it is useful to be able to put questions about growth, about changes in plant capacity and changes in labour use to a large and widely scattered sample of firms and to compare the results for different types of firm. In this article, therefore, we shall consider the following topics: first, the age structure of the population of firms; secondly, which firms have grown in the previous five or six years; thirdly the reasons for failing to grow, or to grow faster, during that period; fourthly, changes in the capacity of the plant and in the percentage use of capacity; fifthly, changes in employment; sixthly, the extent to which innovations have been applied; and finally, the size of firm which the businessman would like to attain.

The Age Structure of the Business Population

Marshall, arguing from his famous parable of the trees of the forest, maintained that ‘ in almost every trade there is a constant rise and fall of large businesses, at any one moment some firms being in the ascending phase and others in the descending.’[1] The rise of a business he ascribed to the energy and intensive saving of the original founder; but ‘ after a while, the guidance of the business falls into the hands of people with less energy and less creative genius, if not with less active interest in its prosperity.’[2] The only counteracting force, as Marshall saw it, was the development of large joint-stock companies. By turning a business into a public company the owners may secure an additional inflow of capital and thus the firm may ‘ under favourable conditions . . . secure a permanent and prominent place in the work of production. But it is likely to have lost so much of its elasticity and progressive force, that the advantages are no longer exclusively on its side in its competition with younger and smaller rivals.’[3]

Marshall had close contacts with the businessmen of his day and it is doubtless from his personal knowledge of the history of individual firms that he drew the somewhat strong conclusions quoted above. But it is difficult to believe that if Marshall were writing today he would be quite so definite in his views on the typical life cycle of a firm. In modern times the ' benumbing shade ' of the larger firms is so dense that it is a rarity for a young firm to struggle through to the ' light and air ' above their branches; and it is rarer still for the larger firms to fall into decay. In this country there are still no official statistics about the births, deaths and rates of growth of firms; but it is known from American sources that both the birth rate and the death rate of firms are much larger amongst small firms than amongst larger firms, and it is probable that the same is true in this country. In the United States in recent years the number of manufacturing firms newly established each year has been in the region of 25,000—which represents a birth rate of about 8 per cent—and the number of discontinued businesses has been approximately the same.[1] Most of this extraordinarily high turnover takes place amongst the very small firms: for example, in the three-year period 1950–52, out of about 90,000 manufacturing firms newly established, nearly two-thirds had less than 4 employees and five-sixths had less than 8 employees.[2] Since the size structure of the business population changes only very slowly it is clear that the firms which close down each year must be distributed by size in a manner very similar to the newly established firms.

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[1] *Principles of Economics* (Eighth edition), p. 316.

[2] *Loc. cit.* [3] *Loc. cit.*

It is probable that in this country also there is a higher rate of turnover amongst small firms than amongst larger firms; but such evidence as we have suggests that the rate of turnover at all levels is much lower than in the United States. As in human populations, the combination of a high birth rate with a high death rate tends to produce a business population with a preponderance of young firms—in number though not necessarily in economic importance. We can, therefore, infer something about the level of the birth and death rates of British firms from information about the age structure of the business population.

Objection is sometimes made to attempts to measure the ages of firms on the grounds of the conceptual difficulties involved. Amongst large firms it may well be that there are cases where it is hard to decide whether the present firm is still the ' same ' firm as that which came into existence at a much earlier date. But amongst small and medium-sized businesses there seems to be little difficulty in establishing the age of the business. Most of the firms covered by our survey were family businesses, in which the element of continuity is very strong. In response to the question ' When was the business founded? ' only 6 firms out of the sample of 876 failed to give an answer.

The distribution of answers to this question is given in Table 1, together with a breakdown of the answers by industry. The most striking feature of this table is, I think, the extraordinary longevity of small and medium-sized businesses in this country. Of the 870 firms which gave their date of foundation nearly one-third were founded before the beginning of this century and

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[1] See *Survey of Current Business*, August 1958, p. 24.

[2] See Betty C. Churchill: ' Size Characteristics of the Business Population ', *Survey of Current Business*, May, 1954, p. 20.

Table 1

Date of Foundation of the Business, Analysed by Industry
(Numbers of firms)

S.I.C. Order No.	*Industry*	*Before 1850*	*1850 –1899*	*1900 –1918*	*1919 –1939*	*1940 –1949*	*1950 –1954*	*Not ascer-tained*	*Total*
3	Bricks, Concrete, Glass, etc.	4	7	3	8	2	—	—	24
4	Chemicals	3	13	2	7	2	—	—	27
5	Metal Manufacture ...	6	8	1	5	2	—	—	22
6	Engineering	8	37	24	56	32	8	1	166
7	Vehicles	1	8	4	12	5	—	1	31
8	Other Metal Products ...	14	25	20	51	24	3	1	138
9	Precision Instruments, etc.	4	4	5	2	8	—	—	23
10	Textiles	13	22	9	33	6	8	2	93
11	Leather goods and Fur ...	1	2	1	—	2	1	—	7
12	Clothing and Footwear ...	2	24	28	65	31	18	—	168
13	Food and Drink	4	5	6	13	1	2	—	31
14	Wood Products	1	13	5	8	1	1	—	29
15	Paper and Printing ...	3	32	18	21	9	1	1	85
16	Miscellaneous	2	8	2	13	7	—	—	32
	Total	66	208	128	294	132	42	6	876

(Percentages—large industries only)[1]

S.I.C. Order No.	*Industry*	*Before 1850*	*1850 –1899*	*1900 –1918*	*1919 –1939*	*1940 –1949*	*1950 –1954*	*Total excluding NA's*
6	Engineering	5	22	15	34	19	5	100
8	Other Metal Products ...	10	18	15	37	18	2	100
10	Textiles	14	24	10	36	7	9	100
12	Clothing and Footwear ...	1	14	17	39	18	11	100
15	Paper and Printing ...	4	38	21	25	11	1	100
	Total	8	24	15	34	15	5	100

[1] The percentages in this and subsequent tables do not always add to exactly 100, because of rounding.

as many as 66 firms (8 per cent) were founded before 1850. Only a little over half the sample of firms came into existence after the end of the First World War and only one-fifth since 1940. If similar information about the age structure of firms were available for the United States it seems unlikely that it would reveal such a large proportion of old-established firms.

In interpreting these figures it is necessary to remember that the sample covers only firms employing between 10 and 499 persons. If it is true in this country, as it is in America, that the great majority of new firms start with less than 10 employees and that some of these succeed in growing beyond that size, then the present age structure of firms employing 10 and over reflects not only the birth rate and death rate of firms of that size in the past but also the gradual upward creep of smaller firms into the 10 and over group. Hence it is not possible to conclude that, because in our sample the density of firms founded in the inter-war period is greater than the density of firms founded between 1940 and 1949, the birth rate of firms in the former period was higher than in the latter. Even less can we conclude from the relatively small number of firms in our sample founded between 1950 and 1954 that

TABLE 2

Date of Foundation of the Business Related to Size of Firm
(Numbers of firms)

Number of employees in 1955	*Before 1850*	*1850–1899*	*1900–1918*	*1919–1939*	*1940–1949*	*1950–1954*	*Not ascertained*	*Total*
10— 19[1]	3	34	20	49	35	9	1	151
20— 29	5	28	32	46	31	11	1	154
30— 39	11	23	17	39	25	10	1	126
40— 49	8	20	8	33	13	4	—	86
50— 74	7	33	22	44	14	5	—	125
75— 99	5	11	6	23	7	1	1	54
100—199	15	39	14	35	6	1	1	111
200 and over ...	9	17	9	20	—	1	1	57
Not ascertained ...	3	3	—	5	1	—	—	12
Total	66	208	128	294	132	42	6	876

(Percentages)

								Total excluding N.A.
10— 19[1]	2	23	13	33	23	6		100
20— 29	3	18	21	30	20	7		100
30— 39	9	18	14	31	20	8		100
40— 49	9	23	9	38	15	5		100
50— 74	6	26	18	35	11	4		100
75— 99	9	21	11	43	13	2		100
100—199	14	35	13	32	5	1		100
200 and over ...	16	30	16	36	—	2		100
Total[2]	8	24	15	34	15	5		100

[1] Including 4 firms with less than 10 employees
[2] Including the 12 firms whose size was not ascertained.

there has been a further decline in the birth rate—or rise in the death rate—since 1950. It may simply be the case that it takes some years for new firms which start with less than 10 employees to rise above that level.

The analysis of the age of firms by industry shows a substantial variation between industries. In Textiles, for example, 14 per cent of the firms were founded before 1850, compared with 8 per cent in the sample as a whole. Thirty-eight per cent of Textile firms were founded before 1900; and in some of the smaller industries even larger proportions of nineteenth century firms can be found. In Paper and Printing a high proportion of firms date from the second half of the nineteenth century, and only one firm in this industry had been founded in the years 1950–54. At the other extreme, the Clothing industry is noteworthy for the fact that relatively few firms survive from the last century. The most probable reason for this is that the amount of capital required to start a clothing factory is relatively small, so that entry into this industry is less impeded on that account. But there may be other reasons also, such as the rise of factory-made clothing in place of home tailoring.

There is—as one would expect—some association between age and size of firm. This is shown in Table 2. It must be remembered that the figures relate to the dates of foundation and sizes of firm which were still in existence (and had 11 or more employees) in 1956. Firms which had gone out of business are automatically excluded from such an *ex post* sample. But, although we have no information about how many of the firms founded in each period had ceased to exist before 1956, it is clear that surviving firms tend to grow and that the longer firms live the larger—on the average—they become. Similar relations between age and size appear when size is measured in terms of turnover or of total assets (as recorded in the balance sheet). In general, therefore, it can be concluded that new entrants are smaller than existing firms when measured by any normal economic characteristics. They hardly, if ever, start at the optimum size, although some of them may struggle gradually up towards it. In this respect most new entrants are clearly at a disadvantage compared with old-established firms.

The Growth of Firms in the Period 1950–56

On a strict view the growth of a firm should be defined in terms of the change in its real net output. But, as a consequence of the changing composition and prices of most firms' inputs and outputs, the measurement of changes in real net output would require very detailed information from each firm for two separate years. It was not thought practicable to attempt to go so far in a survey of this sort; but, in order to get some indication of the changes in each firm's size in recent years, we decided to ask the following question: 'Since 1950, would you say that your firm has grown, declined or remained about the same?' No attempt was made to define growth: it was left to the businessman to do this for himself, in the expectation that in most cases he would think in terms of changes in real net output rather than in terms of employment, turnover, or other aspects of the business.

The answers to this question, analysed by industry, are given in Table 3. As one might expect, in a period in which manufacturing production as a whole rose by about 20 per cent, the majority of firms said that they had grown.[1] Most of the individual industry samples are too small to form the basis of reliable judgments about the characteristics of the populations of firms from which they are drawn; but, in the five industries with samples of 80 or more firms, there seems to be a fairly good relation between the 'growth index', computed from the answers given by the firms, and the official index of production for each industry. This implies that much of the growth of output that had taken place had been through an increase in the output of existing firms, rather than through an increase in the number of firms.

The answers given to this question can be used to test three hypotheses about the growth of firms. The first is that large firms grow more rapidly than small ones. For this purpose the firms in the sample were classified according to their size in terms of average employment in 1950. By taking

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[1] Another reason for expecting this result is that the sample contains only surviving firms which were still employing 11 or more. This gives an automatic upward bias to the distribution of answers to the growth questions.

TABLE 3

Growth or Decline of Firms from 1950 to 1956, Analysed by Industry

S.I.C. Order No.	Industry	*Number of firms which had:*					
		Grown	*Declined*	*Remained about the same size*	*N.A.*	*Growth index*[1]	*Index of industrial production*[2]
3	Bricks, Concrete, etc. ...	15	3	6	—	50	114
4	Chemicals	17	2	8	—	56	149
5	Metals	10	3	9	—	32	125
6	Engineering	110	7	43	6	64	129
7	Vehicles	16	3	12	—	42	132
8	Other Metal Products ...	89	6	40	3	61	118
9	Precision Instruments, etc.	11	3	9	—	35	109
10	Textiles	44	8	34	7	42	97
11	Leather	2	—	4	1	33	89
12	Clothing and Footwear ...	84	25	46	13	38	105
13	Food and Drink	19	2	9	1	57	113
14	Wood Products	19	4	6	—	52	115
15	Paper and Printing ...	64	3	18	—	72	125
16	Miscellaneous	24	—	8	—	75	127
	Total	524	69	252	31	54	121

[1] Number who had grown minus number who had declined, expressed as a percentage of the total in each industry excluding N.A.'s.

[2] Index for 1956 when 1950=100. Source: *Annual Abstract of Statistics*, No. 95.

the base year as the criterion of classification we avoid most of the automatic correlation between past growth and present size which would result from using a more recent basis of classification. But unfortunately some correlation still remains, for the following reason: those firms with 11 employees or over in 1950 which increased in size by 1955 had a chance of being selected for the sample, while those whose employment fell by 1955 to less than 11 had no such chance. But this factor is only likely to have affected firms which employed up to about 29 persons in 1950; few, if any, firms of greater than this size in 1950 would have shrunk to less than 11 by 1955, unless they went completely out of existence. And if they did go out of existence they would probably not bias the comparison, since such an event could occur to a firm of any size.

The results of this analysis are shown in Table 4. As was to be expected, we find a very high proportion of 'grown' firms amongst those employing less than 10 in 1950. But this falls away rapidly in the next two size groups, and for the firms which employed 30 or more in 1950 there is no consistent trend in the proportion of firms which have 'grown'. It is true that only 55 per cent of firms employing between 30 and 49 persons in 1950 said they had grown, compared with 61 per cent of firms employing 50 or over; but this difference is barely significant, and does not justify the conclusion that there is any appreciable difference between the probabilities of growth of firms of different sizes. This analysis, of course, excludes firms employing 500 or over and the public companies, and it is possible that their tendencies

TABLE 4

Growth or Decline of Firms from 1950 to 1956, Analysed by Employment Size in 1950
(*Numbers of firms*)

Number of employees in 1950	*Grown*	*Declined*	*Remained about the same size*	*N.A.*	*Total*
Under 10 ...	31	1	2	1	35
10— 19 ...	90	5	41	—	136
20— 29 ...	84	11	36	1	132
30— 39 ...	57	12	35	—	104
40— 49 ...	37	6	26	3	72
50— 74 ...	67	8	33	1	109
75— 99 ...	32	6	15	—	53
100—199 ...	57	9	28	1	95
200 and over ...	26	6	11	—	43
Not ascertained	43	5	25	24	97
Total ...	524	69	252	31	876

(*Percentages*)

				Total excl. N.A.
Under 10 ...	91	3	6	100
10— 19 ...	66	4	30	100
20— 29 ...	64	8	28	100
30— 39 ...	55	12	33	100
40— 49 ...	54	9	37	100
50— 74 ...	62	7	31	100
75— 99 ...	61	11	28	100
100—199 ...	61	9	30	100
200 and over ...	61	14	25	100
Total ...	62	8	30	100
Total (excluding under 30's) ...	59	9	32	100

are different, especially in view of their relatively free access to sources of extra capital.

The second hypothesis to be tested is a double-barrelled one, concerned with the relation between growth and competition. On the one side we have the classical view, that competition stimulates growth by bringing to the top the strongest and most efficient firms and eliminating the weakest and least efficient. On the other side, it has been objected that ' excessive ' competition may lead to a general weakening of all the contestants and to technical stagnation. It is possible, of course, that there is some truth in both these views. But let us see what answer is given by our figures.

For this analysis the sample was broken down into four groups of firms, according to their statements about the strength of competition facing them. Firms which said they faced ' strong competition ' on both main lines (or on the first if it was the only one) are called ' strong '; the same rule is applied to those which said ' moderate competition ' on both lines; those which said ' no competition to speak of ' on either line are placed under that heading; and firms which said ' strong competition ' on one line and ' moderate

Table 5

Growth or Decline of Firms from 1950 to 1956
Related to Strength of Competition
(Numbers of firms)

Strength of competition[1]	*Grown*	*Declined*	*Remained about the same size*	*N.A.*	*Total*
Strong	239	40	122	21	422
Moderate ...	140	7	56	3	206
Part strong, part moderate ...	62	7	24	2	95
None to speak of...	82	15	49	5	151
Not ascertained ...	1	—	1	—	2
Total ...	524	69	252	31	876

(Percentages)

				Total excl. N.A.
Strong	60	10	30	100
Moderate ...	69	3	28	100
Part strong, part moderate ...	66	8	26	100
None to speak of	56	10	34	100
Total ...	62	8	30	100

[1] In this classification the strength of competition on both main lines is taken into account. See text for details.

competition ' on the other are called ' part strong, part moderate '. Within these four groups we find the following pattern of answers to the question about growth (see Table 5). The group which shows the lowest percentage of ' grown ' firms is the ' no competition to speak of ' group. Next comes the ' strong competition ' group; and finally the two intermediate groups. There is certainly no support here for the hypothesis that strong competition favours growth; but the figures are consistent with the view that the most favourable environment for the growth of established firms is one of ' moderate ' competition, or in other words, a combination of a bit of the stick and a bit of the carrot.

Finally, we may use these data to test an hypothesis derived from discussions of price theory. In the controversy about the economic significance of ' full cost ' pricing it has been suggested by some economists that firms which use this method of pricing act irrationally and without regard to their own best interests. We may ask, therefore, whether firms which follow the full cost system grow more or less than firms which employ other methods. Unfortunately for this test the overwhelming majority of firms in the sample used the full cost method, and the 136 firms which used other methods, were a heterogeneous collection. Some of them worked to prices fixed by their trade associations; others to the prices fixed by an associated firm or by their customers; and only a small minority said that their prices were determined by supply and demand. The test is, therefore, only of limited signi-

TABLE 6
Growth or Decline of Firms from 1950 to 1956
Related to Pricing Method Employed
(Numbers of firms)

Pricing method	*Grown*	*Declined*	*Remained about the same size*	*N.A.*	*Total*
Adds mark-up	448	56	211	25	740
Other	76	13	41	6	136
Total	524	69	252	31	876

(Percentages)

				Total excl. N.A.
Adds mark-up	63	8	30	100
Other	58	10	32	100
Total	62	8	30	100

ficance. Nevertheless, it is of interest to find (Table 6) that the percentage of firms which had grown between 1950 and 1956 was approximately the same for the full cost group as for the others. If anything, more of the full cost firms had grown and fewer had declined.

HINDRANCES TO GROWTH

Once it had been established whether each firm had grown, declined or remained about the same size, it was possible to proceed to inquire what factors were responsible for slowing down or stopping growth, or for inducing an actual decline. Firms which said they had grown since 1950 were first asked: 'Do you feel that (the firm) has grown at a satisfactory rate?' Out of 524 firms which said they had grown, only 116 were found to be dissatisfied with their rate of growth. These 116 firms were then asked: 'What do you think has prevented (your firm) growing at a faster rate?' Similarly, the 252 firms which said they had remained about the same size were asked: 'Why do you think (the firm) has not grown?' The 69 firms which said they had declined were asked: 'What do you think are the reasons for the decline?'

In Table 7 the answers to these questions have been tabulated for the three types of firm separately, so that it is possible to compare the reasons for lack of growth according to the actual extent of growth. For all firms combined the most commonly mentioned reason for failure to grow was shortage of labour. This reason was mentioned by nearly two-fifths of all dissatisfied firms. It is perhaps not a surprising comment on a period such as the years 1950–56, in which employment was almost continuously at a very high level. Shortage of labour was given, not only as a cause of retarded growth by firms which had grown or remained constant, but also as a reason for decline by a quite large proportion of the declining firms. The explanation of this may be either that they lost labour to expanding firms, or that they failed to replace older workers as they retired.

TABLE 7

Hindrances to Growth and Reasons for Decline Related to Experience of Growth or Decline[1]

Reasons for failure to grow or for decline[2]	*Firms which had:*							
	Grown		*Declined*		*Remained about the same*		*Total*	
	No.	%	*No.*	%	*No.*	%	*No.*	%
Shortage of labour ...	40	37	19	29	83	44	142	39
Shortage of finance ...	31	29	2	3	21	11	54	15
Shortage of space ...	25	23	1	2	39	21	65	18
Shortage of materials	8	7	—	—	12	6	20	6
Lack of demand ...	16	15	38	58	64	34	118	32
Other	17	16	17	26	22	12	56	15
Total of firms ...	107	100	66	100	188	100	361	100

[1] The table covers only the 361 firms which were dissatisfied with their size or rate of growth, or had declined since 1950. Firms which failed to give answers to the question about growth, or to the question about hindrances to growth are also excluded.

[2] Since some firms gave more than one reason, the number of reasons exceeds the number of firms.

The next most frequently given reason for inadequate growth was lack of demand. This reason, which includes references to intensity of competition, was given by nearly one-third of all dissatisfied firms. Amongst the declining firms it was, of course, much the most important reason given; but even amongst the firms which had not grown, or had not grown at a satisfactory rate, there was an appreciable number of firms who attributed their failure to grow to lack of demand. In other words, even under conditions of very full employment there may be excess capacity in some parts of the field. This, we shall find, is confirmed by further direct evidence below.

Other interesting reasons given for failure to grow—or to grow fast enough—were shortage of finance and shortage of space. More than a quarter of the firms which had grown—but had not grown fast enough—gave as the reason shortage of finance; and nearly a quarter complained of shortage of space. Shortage of finance was not mentioned by such a large proportion of the firms which had remained unchanged in size, but one-fifth of them attributed their failure to grow to shortage of space. It seems, therefore, that these are two important factors in limiting the growth of small and medium-sized businesses. But whereas special institutions have been established to try to overcome the financial difficulties of small and medium businesses, not very much has been done to help them to find more space. It seems that one of the most effective ways of assisting some small and medium firms would be to establish more trading estates.

The remaining reasons for inadequate growth are less instructive. The only one that was worth classifying was shortage of materials, which was mentioned by 6 per cent of dissatisfied firms. Apart from this, there was a fair number of miscellaneous—and sometimes peculiar—reasons, and there were some firms which gave no answer.

An analysis of hindrances to growth by industry shows that amongst the major industries a rather large proportion of Clothing firms complained of shortage of labour, while only a small proportion of Textile firms made the same complaint. Textile firms are particularly prominent in blaming lack of demand for their difficulties. Paper and Printing firms were generally satisfied with their rate of growth.

Although it was to be expected that there would be some differences between different sizes of firm in the frequency of mention of the various hindrances to growth, no evidence of such differences can in fact be found. It does not appear, for example, that smaller firms were more afflicted by shortages of labour or finance than larger ones, nor by lack of demand. It must be remembered, however, that these conclusions apply only within the limits of the size range covered by this survey and that the methods used here do not provide any measurement of the intensity of the different hindrances mentioned.

CHANGES IN CAPACITY FROM 1950 TO 1956

Growth in the output of a firm may, in some cases, be the result of increasing efficiency of operation, without any increase in the quantity of the primary factors of production employed. But, more usually, growth is accompanied by some change in the use of one or other of these factors, broadly summarised under the headings of land, labour and capital. In manufacturing industry the quantity of land employed is not usually very variable, so that most of the changes in factor inputs represent changes in the employment of labour and capital. In this section we shall consider the answers to questions about changes on the capital side; in a later section we shall consider changes in employment.

The actual question which was put to firms was not directly concerned with capital, since any attempt to measure the volume of capital employed in a business is fraught with great difficulties. Instead of approaching the problem from this direction, therefore, we decided to focus attention upon the question of *capacity*. Each firm was asked: ' Since 1950 has the physical capacity of your plant increased, decreased, or remained about the same—I don't mean your actual output—I mean what you are capable of producing with the available plant and equipment? ' Interviewers were asked to make clear, if necessary, that the level of physical capacity we had in mind was one in which conditions of work were normal for that firm, i.e. without taking into account any additional output obtainable from the same plant by working extra shifts or an abnormal amount of overtime. Apart from this, it should be noted that the concept of capacity covers both the technical characteristics of the equipment installed and the degree of efficiency of the firm in using it. It is conceivable that some firms might have increased their output capacity simply by reorganising their work, without any essential change in the volume of equipment employed. It is probable, however, that most firms which had increased their capacity would have done so by extending the volume of equipment employed or by replacing old equipment by more efficient new equipment. In the former case there would certainly have been an increase in the gross volume of capital employed; but in the latter case we cannot be certain that the more efficient new equipment had a ' real ' value greater than the older equipment it replaced.

In textbooks it is often assumed that there is no clearly marked point of capacity in the use of equipment. Diagrams are drawn which imply that with a given stock of equipment and an increasing supply of labour the marginal product of labour falls away in a smooth unbroken curve. In this survey it was assumed, on the contrary, that there is for each firm, with a given plant, given technique and given working conditions, a clearly identifiable point of capacity operation beyond which the marginal product of labour falls very rapidly, if not vertically. So far as we know, most of the businessmen whom we interviewed had no fundamental difficulty in identifying this concept of capacity, and they made no bones about estimating the change in their firm's capacity, or the degree of use of this capacity.

In view of what we know about the movements in the aggregate real output of manufacturing firms in the period from 1950 to 1956, it is not surprising to find that most of the firms in our sample said that their capacity had increased over the same period. Only 2 per cent of firms said that their capacity had fallen; 34 per cent said their capacity had remained about the same; and the remainder—apart from 40 firms which could not answer the question—said that their capacity had increased. From Table 8 it will be seen that the distribution of these firms according to the percentage increase in their capacity was very widely scattered:[1] although many of them had increased by less than 25 per cent there was an appreciable number whose capacity had increased to two or even three times its 1950 level. Table 8 also shows the relation between changes in capacity and the answers to the ' growth ' question. As one would expect, the proportion of ' grown ' firms which had increased their capacity was much larger than for the other groups; and the largest proportion of firms with reduced capacity is found amongst the firms which had declined since 1950. It is interesting to note that more than a third of the firms which said, in answer to the ' growth ' question, that they had ' remained about the same ' also said later that their capacity had increased in the same period. If these answers are taken at their face value, they imply that amongst this group there had been an appreciable increase in unutilised capacity.

The pattern of increases in capacity is much the same in different industries. Amongst the major industries Paper and Printing contains the largest proportion of expanding firms (80 per cent), although more than half of these had increased their capacity by less than 25 per cent. The proportion of Engineering firms which had increased their capacity by 50 per cent or more was 29 per cent; in Other Metal Products it was 23 per cent; in Textiles 22

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[1] Firms which said that their capacity had increased or decreased were asked: ' Roughly by how much has it changed, in percentage terms? '

TABLE 8

Change in Physical Capacity of Plant since 1950
Related to Growth or Decline of Firm since 1950
(*Numbers of firms*)
Change in physical capacity

Growth or decline of firm since 1950 ...	*De-crease*	*No change*	*Increase of:* *Under 25%*	*25–49%*	*50–99%*	*100–199%*	*200% over*	*N.A.*	*Total*
Grown	1	94	153	72	66	57	55	26	524
Declined	10	37	13	4	4	—	1	—	69
Remained about the same	8	142	73	10	7	4	2	6	252
N.A.[1]	—	8	1	4	2	4	4	8	31
Total	19	281	240	90	79	65	62	40	876

(*Percentages*)

								Total excluding N.A.
Grown	—	19	31	14	13	11	11	100
Declined	14	54	19	6	6	—	1	100
Remained about the same	3	58	30	4	3	2	1	100
Total	2	34	29	11	9	8	7	100

[1] Including firms founded since 1950.

per cent; in Clothing 23 per cent; and in Paper and Printing 31 per cent. Clothing is the only major industry to contain an appreciable proportion of firms whose capacity had fallen since 1950; but even in this case it was only 5 per cent. Nearly half the Clothing firms in the sample had made no increase in capacity in the six-year period, compared with just over a third for the sample as a whole.

The data on change in physical capacity can be used to make a further test of the hypothesis that large firms grow faster than small ones. The result, as in the first test, is negative, as can be seen from Table 9. Amongst firms employing 30 or over in 1950 there is no evidence that larger firms extended their capacity faster than smaller firms. Indeed, the tendency is, if anything, in the opposite direction. Some of this may be attributable to the fact that the larger firms which grew most rapidly passed out of the size range of this sample by 1955, or became public companies, thus excluding themselves from our sample.

TABLE 9

Change in Physical Capacity of Plant since 1950,
Analysed by Employment Size in 1950
(Numbers of firms)

Number of employees in 1950	*Decrease*	*Remained about the same*	*Increase of:*					*N.A.*	*Total*
			Under 25%	*25–49%*	*50–99%*	*100–199%*	*200% & over*		
Under 10 ...	—	6	2	3	2	9	12	2	36
10— 19... ...	—	47	35	12	11	12	16	3	136
20— 29... ...	2	46	25	16	16	13	10	3	131
30— 39... ...	2	40	24	12	11	6	5	4	104
40— 49... ...	2	22	25	10	6	2	1	3	71
50— 74... ...	3	34	45	8	7	5	3	3	108
75— 99... ...	2	16	20	2	9	2	2	1	54
100—199... ...	4	26	37	11	8	4	2	3	95
200 and over ...	2	16	13	6	2	4	—	1	44
Not ascertained...	2	28	14	10	7	8	11	17	97
Total ...	19	281	240	90	79	65	62	40	876

(Percentages)

								Total excl. N.A.
Under 10 ...	—	18	6	9	6	26	35	100
10— 19... ...	—	35	27	9	8	9	12	100
20— 29... ...	1	36	19	13	13	10	8	100
30— 39... ...	2	40	24	12	11	6	5	100
40— 49... ...	3	32	37	15	9	3	1	100
50— 74... ...	3	32	43	8	6	5	3	100
75— 99... ...	4	30	37	4	17	4	4	100
100—199... ...	4	28	40	12	9	4	3	100
200 and over ...	5	37	30	14	5	9	—	100
Total[1] ...	2	34	29	11	9	8	7	100
Total (excl. under 30's and N.A.'s)	3	33	36	11	9	5	3	100

[1] Including N.A.'s.

THE DEGREE OF USE OF CAPACITY

Although the question of the degree of use of industrial capacity is one of the greatest economic importance, very little information about it has ever been collected in this country. During 1958 the Federation of British Industries began to circularise a short questionnaire to chairmen and managing directors of several hundred member firms, in which they included the question, ' Is your present level of output below capacity? '[1] The National Institute of Economic and Social Research have also conducted a pilot inquiry amongst firms engaged in the engineering and chemical industries to ascertain their degree of use of capacity.[2] Both inquiries suggest that in 1958 there was fairly substantial unutilised capacity in industry. In this survey, after the question about the change in capacity, we asked: ' To what extent were you using your capacity in 1950, and in 1955?' Since the answers relating to 1950 are distributed broadly in the same manner as those for 1955, and since they are also less reliable, they will not be considered in any detail. They are used, however, to test one particular hypothesis below.

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[1] See *F. B. I. Review*, July 1958.

[2] A summary of the report on the inquiry is given in *The Economist*, August 9th, 1958, p. 476.

From the answers to this question it seems that in 1955 about half of manufacturing firms in the range of 10–499 employees were operating below full capacity;[2] 29 per cent were working at 75–99 per cent of capacity; and 4 per cent at less than half capacity. The breakdown by industry is given in Table 10. Amongst the five major industries there are only two which show significant differences from the general pattern: Clothing, which has an unusually large proportion of firms working well below capacity, and Paper and Printing, in which nearly all firms were working at least at 75 per cent capacity.

An interesting finding on this aspect of business operation is that smaller firms appear to have a greater proportionate volume of excess capacity than larger firms—at least within the size range covered by this survey. The relevant figures are given in Table 11. It seemed at first that this result

TABLE 10

Percentage of Capacity in Use in 1955
Analysed by Industry
(Numbers of firms)

S.I.C. Order No.	*Industry*	*Percentage of capacity in use*					*Total*
		Under 50	*50–74*	*75–99*	*100*	*N.A.*[1]	
3	Bricks, Concrete, Glass, etc.	1	4	6	13	—	24
4	Chemicals	—	7	7	9	4	27
5	Metal manufacture ...	1	5	5	10	1	22
6	Engineering	8	20	42	90	6	166
7	Vehicles	—	3	12	14	2	31
8	Other Metal Products ...	3	17	38	73	7	138
9	Precision Instruments, etc.	1	—	11	10	1	23
10	Textiles	3	15	24	47	4	93
11	Leather Goods and Fur ...	1	1	1	3	1	7
12	Clothing and Footwear ...	9	40	41	72	6	168
13	Food and Drink	—	9	9	13	—	31
14	Wood Products	3	5	8	11	2	29
15	Paper and Printing ...	1	2	31	45	6	85
16	Miscellaneous	1	6	5	17	3	32
	Total	32	134	240	427	43	876

(Percentages)

						Total excluding N.A.
6	Engineering	5	13	26	56	100
8	Other Metal Products ...	2	13	29	56	100
10	Textiles	3	17	27	53	100
12	Clothing and Footwear ...	6	25	25	44	100
15	Paper and Printing	1	3	39	57	100
	Total	4	16	29	57	100

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[1] Includes 29 firms to which the question was not applicable, usually because they had no fixed plant or equipment.

[2] In the F.B.I. sample in mid-1958 three-quarters of the firms replying said that they were operating below capacity.

might be explained by the fact that the smaller firms in this sample had increased their capacity in the period 1950–55 to a greater degree than other firms (see Table 9). But when firms were classified according to their 1955 employment size the difference in the rate of increase of capacity between larger and smaller firms was no longer evident (presumably because there is a fairly close correlation between changes in employment size and changes in plant capacity). Moreover, as will be seen in Table 12, there is a negative relation between changes in capacity and the degree of use of capacity at the end of the period. So the finding seems to stand: that in 1955 smaller firms were working at a somewhat lower degree of capacity than larger firms.

Except in a completely stationary state, in which that which has been in the past is expected to continue unchanged for an indefinite period in the future, it is, of course, inevitable that there should be some excess capacity. Firms that are growing will tend to expand their plant and equipment ahead of actual output, in anticipation of further growth; while firms that are suffering from a fall in demand will necessarily be operating below capacity. On the whole, it would be reasonable to expect that growing firms would have less excess capacity than stationary firms, and the latter less than firms which have suffered an actual decline. This expectation is supported by the figures in Table 12. Firms which said they had grown from 1950 to mid-1956 are found to have been operating nearer to capacity level in 1955 than any other group; firms which had ' remained about the same size ' between 1950 and mid-1956 had a larger volume of excess capacity; and firms which had declined from 1950 to mid-1956 had a very substantial amount of excess capacity in 1955.

TABLE 11

Percentage of Capacity in Use in 1955, Analysed by Size of Firm
(Percentages of firms)

Number of employees in 1955	*Percentage of capacity in use*				*Total excluding N.A.*	
	Under 50	*50–74*	*75–99*	*100*	*Per cent*	*Number of firms*
10— 19...	8	21	26	45	100	145
20— 29...	7	15	23	55	100	148
30— 39...	3	21	32	44	100	116
40— 49...	1	24	24	51	100	80
50— 74...	1	10	35	54	100	117
75— 99...	—	13	37	50	100	54
100—199...	4	12	28	56	100	106
200 and over	2	7	32	60	100	57
Total[1]	4	16	29	51	100	833

[1] Including 12 firms whose employment size was not ascertained.

For statistical reasons, it might have been expected that there would be some correlation between the direction of change in capacity over the period and the degree of use of capacity at the end of the period. But, if there is such a relation, it is completely swamped by an opposite tendency (see the bottom part of Table 12). From this it may be concluded that firms which start to grow often continue to grow faster than they can add to their capacity, while firms whose output falls often find themselves on a steady downward trend with persistent excess capacity.

We can use the data on the use of capacity to test two further hypotheses. The first is that firms which are nearest to full capacity operation at the beginning of a period will make the greatest proportionate additions to capacity during the period. This test is made in Table 13, in which the changes in capacity between 1950 and 1955 are related to the degree of capacity use in 1950. The figures give moderate support to the hypothesis.

The second hypothesis is that there will be a relation between the proportion of a firm's capacity in use and the length of its order book. This again receives some support from the data (see Table 14), but less than one might expect.

TABLE 12

Percentage of Capacity in Use in 1955
Related to Growth or Decline of Firm from 1950 to 1956
and to Change in Capacity from 1950 to 1956
(Percentages of firms)

Growth or decline of firm since 1950	*Percentage of capacity in use in 1955*				*Total excluding N.A.*	
	Under 50	*50–74*	*75–99*	*100*	*Per cent*	*Number of firms*
Grown	2	12	29	58	100	506
Remained about the same ...	4	21	30	44	100	240
Declined	21	33	23	23	100	61
Change in capacity since 1950						
Increase	2	13	31	54	100	550
About the same	8	22	24	46	100	262
Decrease	(12)	(24)	(29)	(35)	100	17
Total[1]	4	16	29	51	100	833

[1] Including firms whose growth or decline, or change in capacity, was not ascertained.

TABLE 13

Change in Physical Capacity of Plant
from 1950 to 1956 Related to Degree of Capacity Use in 1950

Percentage of capacity use in 1950	*Change in capacity 1950–56*						*Total excluding N.A.*	
	Increase		*About the same*		*Decrease*			
	No.	%	*No.*	%	*No.*	%	*No.*	%
Under 50	15	52	14	48	—	—	29	100
50—74...	65	57	47	42	1	1	113	100
75—99...	125	68	58	31	2	1	185	100
100	321	68	136	29	14	3	471	100
Total[1]	563	65	281	33	19	2	863	100

[1] Including 74 firms whose use of capacity in 1950 was not ascertained.

TABLE 14

Percentage of Capacity in Use in 1955 Related to Length of Order Book in 1956
(Percentages of firms)

	Percentage of capacity in use				*Total excluding N.A.*	
Number of weeks' work on order book	*Under 50*	*50–74*	*75–99*	*100*	*Per cent*	*Number of firms*
Nil	5	18	35	42	100	55
Up to 2	7	15	32	45	100	110
3— 4	3	23	27	47	100	133
5— 8	4	21	27	49	100	169
9—12	3	16	35	46	100	92
13—26	3	8	30	59	100	164
27 and over ...	3	6	23	68	100	79
Total[1] ...	4	16	29	51	100	833

[1] Including 33 firms whose length of order book was not ascertained.

CHANGES IN THE VOLUME OF EMPLOYMENT

The second main factor of production whose changes will be considered is labour. The information from the survey about changes in employment was collected in the following manner. Each firm was asked for details of the composition of its labour force in the last pay week of October 1950, and in the last pay week of October 1955—this being the type of information which is supplied regularly to the Ministry of Labour. The October figures for each year were adjusted to take account of information obtained about fluctuations in the number employed at different times of the year, thus providing an estimate of average employment over the whole year. Owners, partners, outworkers and canteen staff were excluded, and each part-time worker was counted equal to half a full-time worker. The change in average employment between 1950 and 1955 was then expressed as a percentage of the 1950 figure.

What sort of distribution of changes in employment would one expect to obtain from such an inquiry? In the aggregate, employment in manufacturing increased from the end of June 1950 to the end of June 1955 by about 8.2 per cent. The number of firms engaged in manufacturing at different dates is not available but, to judge from statistics published by the Board of Trade and the Ministry of Labour, the number of manufacturing *establishments* employing 11 or over did not change much between 1949 and 1956. The number of manufacturing *firms* above this size-level may well have declined. It could be expected, therefore, that, on balance, the number of firms showing an increase in employment would exceed the number showing a decrease, unless the increases were concentrated on large firms and the decreases on small ones. But there are no *a priori* reasons for expecting that the range of the distribution of percentage changes should be either large or small. It is sometimes assumed, in discussions of the effects of full employment and shortage of labour, that in these circumstances mobility of labour will be much restricted and that the sizes of firms will not change very rapidly.

Against this, we know from Ministry of Labour figures that the gross turnover of labour in manufacturing is very high—of the order of 3 or 4 per cent per month. We do not know what proportion of this is attributable to a 'stage army' moving from firm to firm; but even on the assumption that a section of the labour force is of this restless disposition, the statistics still leave plenty of room for changes in the employment of more stable members of the labour force.

The findings of this inquiry confirm that the distribution of changes of employment between 1950 and 1955 was skewed towards the positive side. They also show a very wide dispersion in employment changes over these five years. As we have noted previously, the inclusion in the analysis of firms in the range of 10–29 employees in 1950 tends to bias the results. But, even when these are excluded, we find that more than one-tenth of firms had reduced their employment by 25 per cent or more between 1950 and 1955, and that more than one-sixth had increased their employment to the same extent. Table 15 reveals the interesting fact that the pattern of percentage

TABLE 15

Percentage Change in Employment from 1950 to 1955, Analysed by Employment Size in 1950[1]

(Numbers of firms)

Employment in 1950	*Employment fall of:*		*Less than*	*Employment rise of:*				
	25% or more	*10–24%*	*10% change*	*10–24%*	*25–49%*	*50–99%*	*100% or more*	*Total*
Under 10 ...	—	—	—	—	2	7	26	35
10— 19 ...	7	10	49	16	20	9	25	136
20— 29 ...	16	12	49	17	15	13	10	132
30— 39 ...	16	19	41	11	10	5	2	104
40— 49 ...	6	16	29	12	3	5	1	72
50— 74 ...	9	20	43	15	11	7	4	109
75— 99 ...	8	13	16	4	6	2	4	53
100—199 ...	10	19	34	14	9	7	2	95
200 and over ...	3	10	20	5	2	2	1	43
Total ...	75	119	281	94	78	57	75	779

(Percentages of firms)

Under 10	—	—	—	—	6	20	74	100
10— 19	5	7	36	12	15	7	18	100
20— 29	12	9	37	13	11	10	8	100
30— 39	15	18	40	11	9	5	2	100
40— 49	8	22	40	17	4	7	1	100
50— 74	8	18	39	14	10	6	4	100
75— 99	15	25	30	7	12	7	4	100
100—199	10	20	36	15	10	7	2	100
200 and over	7	23	46	12	5	5	2	100
Total	10	15	36	12	10	7	10	100
Total excl. under 30's	11	20	38	13	8	6	3	100

[1] Excluding 97 firms whose employment in 1950 was not ascertained.

changes in employment was very similar for all sizes of firm above 30. This might be held to support the view that there is a stochastic ' law ' determining the distribution of firms by size, similar to that which has been put forward to account for the distribution of incomes.[1] Alternatively, the figures may simply be interpreted as reflecting that part of the changes in the sizes of firms which is so far indeterminate. It is easy to think of possible reasons for the fluctuations in the number of employees of an individual firm. Some may be the direct consequence of short-term changes in demand; some will be caused by a long-term rise or fall in the productive capacity of the firm, accompanied by changes in the volume of labour employed in the same direction; some may also be the result of a planned reduction in the number of direct employees, made possible by changes in technical methods and the type of equipment installed. The incidence of these changes on a representative group of firms in any particular period of time may be quasi-randomly distributed; but it does not follow that the actual distribution of firms by size is a purely stochastic phenonemon. Rather, we may say that there is an element of chance in the determination of an individual firm's size at any particular moment.

Analysis of the changes in employment by industry shows relatively little variation in the pattern between industries, especially for the five larger industries. Analysis by the growth or decline of the firm from 1950 to 1956 shows, as one would expect, a fairly strong association between ' growth ' or ' decline ' and changes in employment. The same is true of the relation between changes in capacity and changes in employment. This latter analysis is given in detail in Table 16. It will be noted that the tendency of the association is such as to imply a rising productivity of labour on the average.

The Use of Innovations

It is generally possible to increase a nation's real output per head, even without any striking improvements in technical knowledge, by ensuring that existing knowledge is more widely applied and that factors of production are employed in their most fruitful occupations. But, while economic policy should be directed so far as possible towards the achievement of this optimum arrangement of the factors of production, this should not be the sole object of policy in the economic sphere. The most important advances in mankind's standard of life have come about, not by a more perfect adaptation of organisation to existing conditions, but by revolutionary changes in the technical framework itself. Hence it should be at least as important an objective of economic policy to ensure that new techniques are being rapidly developed and applied as to strive to perfect the allocation of resources in relation to each given technical situation.

It was not possible in this survey to do more than touch on the fringe of this great problem; but it was considered useful at least to ask one relevant question. All firms were asked: ‘ Have there been any marked advances or innovations in production techniques in your industry since the war? ’ And those that said there had been advances or innovations were asked: ‘ Have you used them? ’ These questions do not attempt to discover which, if any, of the firms were themselves responsible for innovations; but they do help us to identity the firms which had *applied* new advances or innovations in the post-war period.

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[1] See J. Aitchison and J. A. C. Brown, *The Lognormal Distribution*, 1957; and D. G. Champernowne, 'A Model of Income Distribution,' *Economic Journal*, June 1953.

The most remarkable—and disturbing—fact which emerges from this question is that 505 firms out of 876 (or 59 per cent of those answering) said that there has been no marked advances or innovations in their industry since the war. This may be interpreted to mean either that there had not in fact been any important technical advances in the industries to which these firms belong—and this is not inconsistent with the existence of other firms in the same broad industrial group taking the opposite view—or that despite the existence of technical innovations many firms were unaware of them. But in either case the position is extremely unsatisfactory.

TABLE 16

Percentage Change in Employment from 1950 to 1955
Related to Change in Physical Capacity of Plant from 1950 to mid-1956
(*Numbers of firms*)

Change in capacity of plant	*Employment fall of:*		*Less than 10% change*	*Employment rise of:*			*100% or more*	*N.A.*	*Total*
	25% or more	*10–24%*		*10–24%*	*25–49%*	*50–99%*			
Decrease	7	6	3	—	1	—	—	2	19
No change	34	50	116	25	13	7	4	32	281
Increase of:									
Under 25%... ...	18	41	100	32	23	5	6	15	240
25— 49%	7	6	29	14	12	10	3	9	90
50— 99%	5	8	14	12	12	15	7	6	79
100—199%	1	2	9	3	12	12	17	9	65
200% and over ...	—	1	2	4	4	5	35	11	62
Not ascertained ...	3	5	8	4	1	3	3	13	40
Total	75	119	281	94	78	57	75	97	876

(*Percentages of firms*)

								Total excluding N.A.
Decrease ...	41	35	18	—	6	—	—	100
No change ...	14	20	47	10	5	3	2	100
Increase of:								
Under 25% ...	8	18	44	14	10	2	3	100
25— 49% ...	9	7	36	17	15	12	4	100
50— 99% ...	7	11	19	16	16	21	10	100
100—199% ...	2	4	16	5	21	21	30	100
200% and over ...	—	2	4	8	8	10	69	100
Total ...	10	15	36	12	10	7	10	100

Of the 350 firms which knew of the existence of ‘marked advances or innovations’ nearly four-fifths had used them. This strong relation between ‘knowers’ and ‘users’ lends colour to the view that many of the firms which said there had been no marked advances or innovations were, in fact, ignorant of what was available, and might have made use of the new techniques if they had been better informed. This possibility could, however, be checked only by means of a survey within each narrowly-defined industry, to see how many small or medium-sized firms are aware of the technical possibilities open to them. Within our broad industrial groups—each of which inevitably covers a wide range of technically distinct industries—the Other Metal Products group contains the largest proportion of firms which claimed to have used innovations in production techniques since the war (see Table 17).

TABLE 17

Knowledge and Use of Innovations, Analysed by Industry
(Numbers of firms)

S.I.C. Order No.	*Industry*	*No innovations since war*	*Some innovations since war*		*N.A.*[1]	*Total*
			Used by firm	*Not used by firm*		
3	Bricks, Concrete, Glass, etc.	13	5	4	2	24
4	Chemicals	15	8	2	2	27
5	Metal Manufacture ...	10	8	4	—	22
6	Engineering	114	40	11	1	166
7	Vehicles	18	10	1	2	31
8	Other Metal Products ...	69	56	11	2	138
9	Precision Instruments, etc.	12	9	—	2	23
10	Textiles	50	36	7	—	93
11	Leather Goods and Fur	5	2	—	—	7
12	Clothing and Footwear	105	41	19	3	168
13	Food and Drink ...	19	10	1	1	31
14	Wood Products ...	19	9	1	—	29
15	Paper and Printing ...	41	29	10	5	85
16	Miscellaneous	15	13	3	1	32
	Total	505	276	74	21	876

(Percentages of firms)

					Total excl. N.A.
6	Engineering	69	24	7	100
8	Other Metal Products ...	51	41	8	100
10	Textiles	54	39	8	100
12	Clothing and Footwear ...	64	25	12	100
15	Paper and Printing ...	51	36	13	100
	Total	59	32	9	100

[1] 16 firms did not answer the first question and 5 more failed to answer the second.

Of the large industries Textiles comes next in the scale of technical progressiveness; and not far below it is Paper and Printing. This industry, however, had an unusually large proportion of firms which acknowledged the existence of technical advances which they had not yet employed. It is disturbing to find that in Engineering only one-quarter of the small and medium-sized firms in our sample had made use of ' marked advances or innovations in production techniques ' since the war. It is less surprising, perhaps, to find that Clothing is in a similar position.

It is often suggested that larger firms are technically more progressive than small firms. No one has yet been able to support this hypothesis statistically, although there are certain obvious facts about the activities of very large companies which make it highly plausible. It is, therefore, of not a little interest to study the analysis presented in Table 18, showing the ways in which firms of different sizes answered the questions about innovations. The figures clearly indicate that a greater proportion of the larger firms knew of ' marked advances or innovations ' than of the smaller firms, and that more of the larger firms had used these innovations. It is especially worthy of note that the proportion of firms knowing about innovations, but not using them, was larger amongst the smaller firms than amongst the larger firms. Thus it seems that smaller firms are not only less aware than larger firms of the technical possibilities open to them but are also slower in applying the new techniques, even when they know about them.

TABLE 18

Knowledge and Use of Innovations, Analysed by Size of Firm
(Percentages of firms)

Number of employees in 1955	*No innovations since the war*	*Some innovations since the war*		*Total excluding N.A.*	
		Used by firm	*Not used by firm*	*Per cent*	*Number of firms*
10— 19	64	24	12	100	149
20— 29	63	26	11	100	148
30— 39	63	28	9	100	123
40— 49	48	38	15	100	82
50— 74	60	34	6	100	125
75— 99	68	30	2	100	53
100—199	56	43	1	100	109
200 and over ...	40	51	9	100	55
Total[1] ...	59	32	9	100	855

[1] Including 12 firms whose size was not ascertained.

DESIRED SIZE OF FIRM

We come, finally, to the question of the psychological attitude of businessmen towards the growth of their firms. It is generally assumed that most businessmen want to see the scale of their operations increase. But some will be more interested in growth than others; and it may be that the businessman's degree of interest in, or desire for, growth is a factor which influences the rate at which his firm does grow. It is not possible to test this latter hypothesis from the data at our disposal, since we do not know what ambitions were held at the beginning of the period to which the survey's figures relate.

However, we did ask all the businessmen whom we interviewed about their current ambitions. The question, which came immediately after the questions about past growth and the reasons for failure to grow or to decline, was phrased as follows: ' What sort of size would you like to be—in terms of turnover? ' The answers were mostly given in terms of percentage changes in turnover.

Out of 876 businessmen in the sample, 77 gave no answer to this question, 6 said they would like their firm to be smaller, 221 said they would like to be the same size as at present, and the remainder said they would like to be larger, the proportionate increase in their turnover ranging from a few percentage points up to four or five hundred per cent. Some businessmen simply said ' as big as possible ' or ' the sky's the limit '.

The differences between industries on this question are not very marked. If we exclude the firms which gave no answer, we find that 31 per cent of businessmen in Engineering wanted their firm to remain the same size, 27 per cent in Other Metal Products, 34 per cent in Textiles, 24 per cent in Clothing and 36 per cent in Paper and Printing. The last three are significantly different from the overall average (at the 5 per cent level); but, except in the case of Printing, the difference is not great.

There is no sign of any consistent tendency for businessmen's desires for growth to vary with the size of firm; but there is a certain tendency for their desires to be related to past experience of growth. Of the firms which had grown in the previous six years 74 per cent wanted to grow in the future, against 81 per cent of those which had declined. But the least ambitious set of businessmen were those whose firms had remained about the same size in the previous six years: 37 per cent of these wanted to remain ' about the same ' in the future also. It may be that they had already attained the optimum size of firm; or that they had become disillusioned by experience; or, lastly, that they were just not ambitious.

The most intriguing finding from the answers to this question is the discovery of a relation between the strength of a businessman's ambition and his age. Of the 876 firms in the sample 783 were companies (773 private companies and 10 public companies not quoted on the Stock Exchange); and for each company we asked the age of its managing director. Fifteen companies had no managing director and 31 failed to give his age. For the remaining group of companies, the relation between the age of the managing director and his strength of ambition is shown in Table 19. The figures suggest that, if ambition and ultimate success are correlated—as they probably are—firms headed by younger men are more likely to expand than those whose managing directors are in their sixties and seventies.

TABLE 19

Desired Size of Firm Related to Age of Managing Director—Companies Only
(Percentages of companies)

Age of managing director	*Desired size in terms of turnover*			*Total excl. N.A.*	
	Same as now[1]	*Increase of:*		*Per cent*	*Number of firms*
		Up to 100%	*Over 100%*		
Under 40	23	44	33	100	62
40—49	25	52	23	100	211
50—59	29	53	18	100	207
60—69	31	50	19	100	137
70 and over	39	53	8	100	62
Total[2]	28	51	21	100	717

[1] Including 6 firms which wanted to be smaller.
[2] Including firms with no managing director or which failed to give his age.

CONCLUSIONS

The following are some of the more interesting findings from the survey on the factors influencing growth:

(1) A remarkably large number of British firms are very old—even amongst the small firms.

(2) The substantial growth in British manufacturing output over the period 1950–56 took place primarily through an expansion of existing firms, rather than through an increase in the number of firms. Very few firms suffered an actual decline in output or in capacity; but a large proportion succeeded in reducing the amount of labour they employed. Productivity increased.

(3) There was no tendency—within the size range covered by the survey (10–499 employees)—for larger firms to grow more rapidly than smaller firms.

(4) The chief hindrances to faster growth—or causes of decline—were shortages of the basic factors of production—labour, finance and factory space—and lack of demand.

(5) Even in 1955—when British industry was alleged to be suffering from extreme pressure of demand—only half the firms covered by this survey said they were working at full capacity. One-fifth was operating below 75 per cent capacity. Smaller firms had more excess capacity than larger firms.

(6) A disturbingly large number of firms were unaware of any marked advances or innovations in production techniques in their industry since the war; but most of those which knew of them had used them. Fewer of the smaller firms had used them than of the larger.

(7) Most businessmen want their firms to grow; but, as one might expect, younger men are more ambitious than older ones.

CAN THE LEVEL OF UNEMPLOYMENT EXPLAIN CHANGES IN WAGES?

By K. G. J. C. KNOWLES *and* C. B. WINSTEN

'The treating as constant of what is variable is the source of most of the fallacies in Political Economy.' F. Y. EDGEWORTH.[1]

In a recent article,[2] Professor Phillips attempts to explain the movement of money wages over the past hundred years or so, but without reference to most of the associated changes which are usually considered relevant to wage determination. During the period covered by his survey, trade unions have immeasurably extended their membership, power and influence; a network of institutions and institutional procedures has come to govern industrial relations in general and wage-fixing in particular; the distribution of wealth has been drastically changed, partly by legislation and by the birth and development of social insurance; the external economic relations of the country have radically altered; and social attitudes have been recast with the shifting of the balance of economic and political power. It may not be fair to Professor Phillips to suggest that, like Gallio, he cares for none of these things; but it is true enough that they rarely figure, explicitly or implicitly, in his analysis. To him, the rate of change of wages—past, present and future—is in effect a simple function of the level of unemployment and its changes; indeed, he thinks, the mechanism of prediction has been available for more than forty years, if only someone had had the eyes to see it and the sense to use it: 'the actual results obtained' (*i.e.*, the wage history of the inter-war years) 'given the levels of unemployment which were held, could have been predicted fairly accurately from a study of the pre-war data, if anyone had felt inclined to carry out the necessary analysis.'[3] With very few modifications, Phillips' analysis rests upon a summarised presentation of the wage and unemployment experience of the years 1861 to 1913. He has, in short, attempted a daring simplification of what is generally thought to be a highly complex problem. Such an attempt is essentially a worthy one and, if the facts were to justify his methods and findings pragmatically, economists, historians and others could afford to forget the complexities and applaud his endeavour. If, however, they do not, his courage is merely a measure of his vulnerability.

From an examination of the course of various series of estimates of the level of unemployment and of the rate of change of money wage rates from 1861 to 1957, Professor Phillips allows himself to infer that, in general,

> 'it seems from the relation fitted to the data that if aggregate demand were kept at a value which would maintain a stable level of product prices the associated level of unemployment would be a little under 2½ per cent. If, as is sometimes recommended, demand were kept at a value which would maintain stable wage rates the associated level of unemployment would be about 5½ per cent.'[4]

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[1] Quoted by O. Morgenstern, *Limits of Economics*, 1937.

[2] A. W. Phillips, 'The Relation between Unemployment and the Rate of Change of Money Wage Rates in the United Kingdom, 1861–1957,' *Economica*, November, 1958.

[3] *Op. cit.*, p. 295.

[4] *Op. cit.*, p. 299.

This is a gloomy pronouncement by present-day standards and, even if we begin by accepting the figures which he has to use, they hardly justify the conclusion he draws from them. We may first reproduce the curve which he derives from the data for the period 1861–1913 (Diagram I). This curve is, in effect, an estimate of the regression line[1] of the mean rate of change of money wage rates on unemployment. In isolation, the curve could be taken to suggest the existence of a Natural Law operating with the inevitability and precision of the laws of classical physics and, if we were to look no further, it might indeed seem plausible that to condemn 2½ or 5½ per cent of industrial workers to idleness was the price of halting a too rapid rise in wage rates.

But if we look instead at the data which Phillips is attempting to interpret, and plot the figures of percentage unemployment and of rate of change of money wages for all years from 1861 to 1957 (Diagram II[2]), any impression of a rigid relationship instantly dissolves. Effectively, all we can deduce from the figures is that up to now—in this country at any rate—a high rate of increase in wage rates has never been associated with a high level of unemployment, and that anything like full employment has never coincided with much of a decline in wages. But all other combinations have occurred. Thus, if one is primarily interested in what rates of increase in wages had been compatible with, say, up to 3½ per cent unemployment, the answers are given in Diagram III. On some occasions money wages rose exceedingly sharply; on others they hardly rose at all. On the other hand if one were primarily interested in what degrees of unemployment had been compatible with fairly stable wages, the answers would be equally diverse (and could be obtained by cutting off the top part of Diagram II).

Professor Phillips' method of approach is based on the idea that unemployment is a cause of the rate of change of money wage rates. This approach may be inferred from the fact that he fits his regression of wage change on unemployment and not *vice versa*, and is explicitly stated in the first paragraph of his conclusions (' the rate of change of money wage rates can be explained by the level of unemployment . . .'[3])—although the use of the phrase ' associated level of unemployment ' in the following paragraphs makes his views about the pattern of causation much less clear. We would, of course, agree with this type of approach up to the point—but only up to the point—of stating that, if unemployment is high, wage rates are most unlikely to rise rapidly. But this is not the sort of result that is of very much use nowadays, as it is generally accepted that unemployment must be kept low. Diagram

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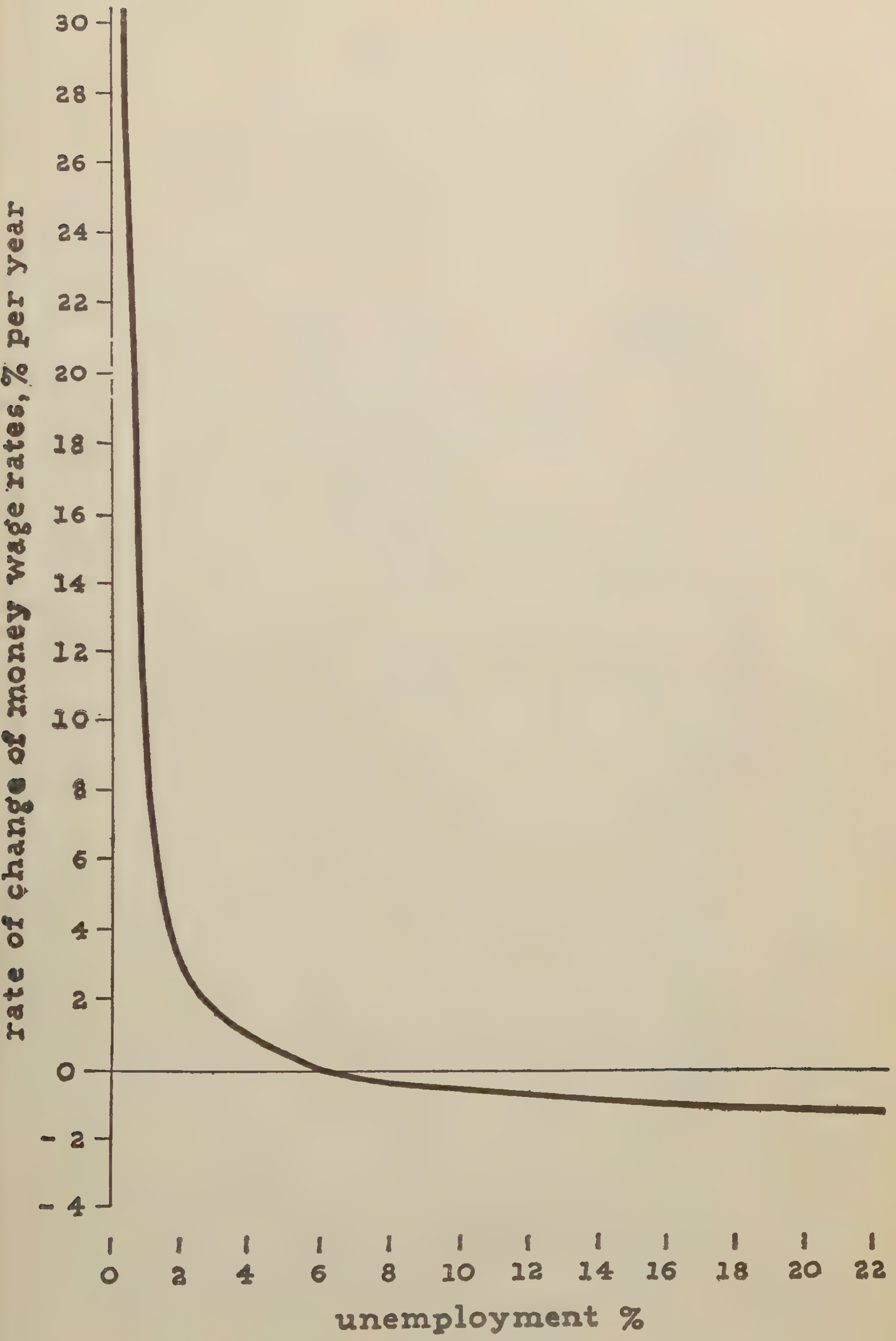
[1] There are, as we shall see, reasons why—for these data—the emphasis on a regression line is misplaced. However, supposing a regression line were desirable, Professor Phillips need not have troubled himself with the niceties of fitting a hyperbola: the line of averages which he marked with crosses (in Figure 1 on p. 285 of his article) would have sufficed. The hyperbola merely adds an extra strait-jacket to his treatment of the data: there is no reason why a simple mathematical function should express the average relationship of the rate of change of money wages to the level of unemployment at very low and very high levels alike.

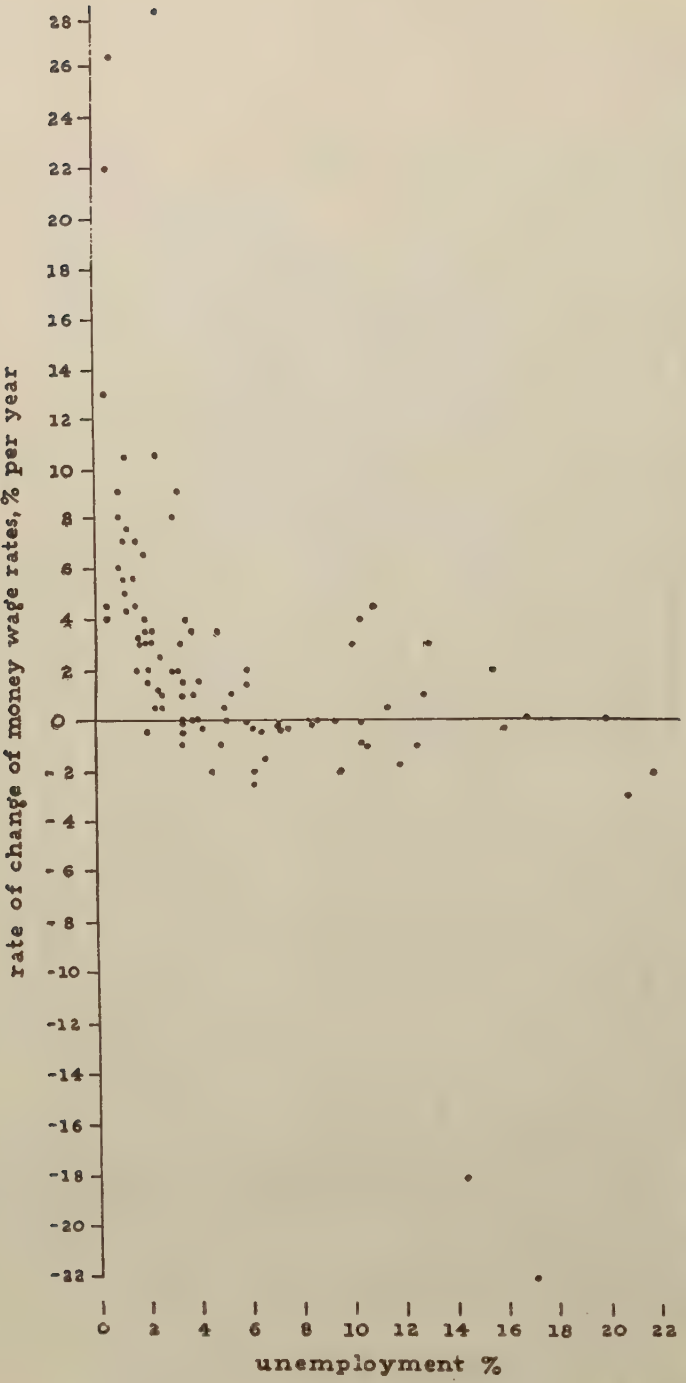
[2] The points on this and the following diagrams have been re-plotted from various diagrams of Professor Phillips.

[3] *Op. cit.*, p. 299.

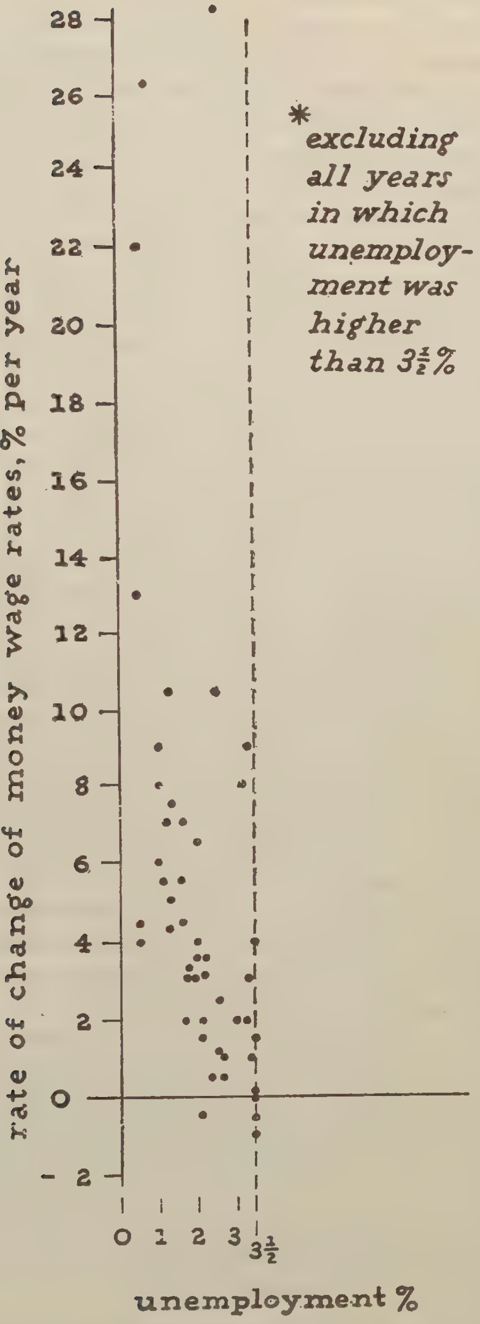
I: Curve based on 1861-1913 data



II: 1861-1957


28
26
24
22
20
18
16
14
12
10
8
6
4
2
0
- 2
- 4
- 6
- 8
-10
-12
-14
-16
-18
-20
-22
rate of change of money wage rates, % per year
0
2
4
6
8
10
12
14
16
18
20
22
unemployment %

III: 1861-1957*



excluding all years in which unemployment was higher than 3½%

III shows that, when it has in fact been kept low, as it has during the post-war period, there has been an extreme variability in the rate of change of wages. Thus, granted that unemployment may play *some* part in the causal chain, in this region there is still a very great deal left to explain.[1]

Phillips' remarks on the loops traced by the successive points of his diagrams during the course of trade cycles do constitute the beginnings of such further explanation—although, to be useful, they need more careful and detailed working out. The loops certainly suggest some sort of dependence of wage changes on past as well as on present unemployment; but this dependence could be of several different kinds. He alludes to two in passing: (*a*) wage changes are thought of as simply subject to lags, *i.e.* are determined by the unemployment of a few months back and not by that of the present, and (*b*) they are thought of as determined by expectations based on an extrapolation of the experience of previous months. We must emphasise that (*a*) would result in the loops running *clockwise*,[2] while (*b*) would result in their running *anti-clockwise*[3]—which they do in every case except the last. This distinction between the directions in which the loops would run can surely help to distinguish between the two effects, contrary to what Professor Phillips thinks when he states that it is ' difficult to discriminate at all closely between the effects of time lags and the effect of dependence of wage changes on the rate of change of unemployment '[4]—though admittedly we are not sure that we understand this sentence aright. At any rate a combination of these two interpretations could, in theory at least, account for the progressive narrowing of the loops and for the eventual reversal of their direction. We should have to think of the economy as consisting of two sectors, one working on anticipations and the other subject to time lags (say, the procedural time lags involved in the process of collective agreement); then, if the latter sector were to have gained in importance compared with the former, anticipations would carry progressively less weight and the loops would narrow and eventually change their direction.

But these are only two of the many forces that could conceivably have helped to determine the course of wages during the past hundred years. Professor Phillips has chosen to neglect almost completely one of the most widely discussed of the possible links in the chain of wage determination—the effect of the cost of living. Most people would agree that nowadays, especially when unemployment is low, the cost of living has a marked influence on the course of wages, and therefore that to explain wages one has in turn to consider the influences operating on the cost of living. One such influence which has a strong claim to consideration is the course of wages themselves in a period just before that considered—after all, this is usually accepted as one of the spinners of the inflationary ‘ spiral ’.[1] The spiral itself might sometimes cause a loop in a diagram of the Phillips type: other things being equal, the loop would run clockwise.[2] The fact that, as we observed above, Phillips’ loops ran anti-clockwise until very recently suggests that other causes were dominant earlier on; however, the narrowing of the loops might partially be explained by the increasing importance of the ‘cost of living’ as a factor in wage negotiations—always supposing that such a hypothesis could in fact be adequately supported by evidence. To adopt even a plausible explanation without attempting to verify it is to beg the question.

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[1] In technical language, it appears that the variance of W (rate of change of wages) for a given U (unemployment) increases rapidly as U becomes low. To such a scatter of points, a hyperbola gives the eye the impression of a good fit. But this fit can be largely illusory, for the eye tends to look at the *shortest* distance of a point from the fitted line. Where the hyperbola rises sharply, as it does for low values of U, a point may be near the curve if the shortest distance is measured, but be far from the point on the curve *which has the same U value as itself*. It is the distance to the latter point that is of importance in judging how well the causal theory fits the facts. (Since the shortest distance is affected by the choice of scales for W and U, so is the extent of the optical illusion.)

[2] In this case, when U *drops* through a particular value, W will (because of the lag) be dependent on an earlier and therefore higher U. It will therefore tend to be *lower* than if U had been stationary for some time at its present value. On the other hand, when U *rises* through this value, W will be dependent upon an earlier and lower U, and will therefore itself be *higher*.

[3] If the rate of change of wages is held to be determined by anticipations, then if unemployment had been *dropping* people would expect it to be even lower in the future and W would tend to be *higher* than would otherwise have been likely—while with *rising* unemployment, by the same argument, W would be *lower*.

[4] *Op. cit.*, p. 293.

It may be simply that Phillips’ attempt to deduce a simple law of wage determination is based on the experience of half a century ago accounts for his neglect of factors which have more recently come into prominence. The material on which the first cost-of-living index was based was collected by the Board of Trade in 1904, and the cost of living did not enter—institutionally at any rate—into wage determination for another ten or fifteen years. But while, for this and other reasons, the influence on wages of cost-of-living considerations may well have increased since then, there is no reason to dismiss them as virtually inoperative throughout. Again, Phillips appears to neglect the distinction between rising wage rates and rising earnings. He mentions more than once the notion of employers’ ‘competitive bidding for labour ’, but the mechanism of this is rather different from what it was. Recently, attention has been called to the offering of ‘ bribery rates ’ or ‘ temptation rates ’ (above nationally negotiated levels) by particular employers in order to retain or to poach workers from other firms in a period of acute labour shortage, and to the way in which this practice has contributed to a persistent pushing-up of earnings irrespective of wage rates. Partly as a consequence, of this, there has developed the ‘ wage-drift ’ or rates-earnings gap. If the bidding up by employers is discounted, and greater emphasis is laid (as it is by some) on trade union pressure and on the advance of piece-

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[1] Import prices and productivity also, of course, help to determine the cost of living, and Phillips does mention these. But he appears to do so only in order to dismiss most of the possible effect of the cost of living on wage movements (*op. cit.*, p. 284). Surely, if the cost of living rises by 5 per cent, employers will—other things being equal—bid up, and negotiators negotiate, higher wages than if the cost of living remains stable? If so, it hardly seems justifiable to ignore it.

[2] The reasons may be summarised as follows:

Falling unemployment (*i.e.* higher previous unemployment);	Rising unemployment (*i.e.* lower previous unemployment);
↓	↓
lower previous cost of living	higher previous cost of living
↓	↓
lower rate of wage change in this period	higher rate of wage change in this period

—where the comparisons implied by ‘ higher ’ and ‘ lower ’ are between corresponding quantities in the respective columns.

work earnings through increased productivity, these pressures again must often operate to extend the rates-earnings gap[1] rather than directly to raise the level of nationally negotiated wage rates—although the drift may itself exercise some upward pressure on wage rates in the course of time. These are comparatively new tendencies, and—except to a determined equilibrist—their interaction and varying strengths seem likely to affect the rate at which wage rates rise when unemployment is low. Phillips' law could, in effect, have been formulated by 1913. If a prophetic Victorian or Edwardian had been ambitious enough to lay down the laws of wage determination for all time, his allusions to future developments could hardly have failed to seem nebulous and incomplete to his successors; and Professor Phillips, since he largely neglects recent tendencies, has to accept the handicap of appearing something of an anachronism.

There are, indeed, so many ways in which the past variation of wage-rate indices may be partially accounted for that one can hardly pin one's faith to a single explanation of the type offered. In the first place, one would have to be sure that the observed patterns were ' real ' and were not in part products of the kinds of indicator available.[2] But even if we felt confident of having achieved a ' complete ' explanation of wage movements in the past, we should still really be no nearer an iron law of wage determination. We should no doubt have come to understand several causal chains, and the strength and importance of their links. But any of these observed links may, over the course of time, weaken or break because of changes in behaviour or institutional structure—whether these changes happen of their own accord or are achieved by a conscious policy adopted by a sufficiently powerful organisation. Indeed, one reason for analysing historical data is precisely to discover which links are important and which of these are the most susceptible of modification. Much of the recent discussion of the problems of inflation, for instance, has been bedevilled by an undue emphasis on ultimate or completely autonomous causes, although—especially for policy-making—it is equally important to find frangible links in the chain of causation. Professor Phillips' study, despite his explicit and implicit qualifications, seems likely to be read (and, possibly, to be used) as the exposition of a fairly simple and rigid law. But any such fatalism would be based on fallacy.

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[1] *i.e.* the gap between nationally negotiated wage rates and earnings for a standard week (we are not considering here the effect of overtime working).

[2] Without detailed examination, it is of course impossible to judge how far the changing bases of Phillips' data materially affect the picture presented; but their possible peculiarities call for more than the reference to purely pragmatic standards accorded to the wage-rate data (*op. cit.*, p. 291). The scope of the unemployment data has also notably altered over the course of the century; trade union unemployment benefit, unemployment insurance, and national insurance schemes have no doubt resulted in different estimates of proportions unemployed. Thus 2 per cent unemployment to-day might be the equivalent of 2½ or 3 per cent before the war, which might in turn have been the equivalent of a lower percentage in the nineteenth century. While the internal inconsistencies of the data might not, on examination, affect the picture decisively, they might at least constitute a *caveat* against claiming any very great accuracy for the results obtained, even if the method employed appeared appropriate.

INEXPENSIVE NUTRITION BEFORE AND AFTER THE WAR

By T. Schulz

The question, by how much prices have risen since before the war is—strictly speaking—unanswerable, except in the case of raw materials. For what is being bought and sold now is often very different from the things that went by the same name some twenty years ago. This is true to some extent even of certain basic foodstuffs: calcium reinforced bread and flour, vitaminized margarine, tuberculin-tested and pasteurized milk, are not the same bread and flour, margarine, and milk, that passed over the shop counters in the nineteen-thirties. Nevertheless, the essential character and the culinary utility of what may be termed dietary essentials, have remained unaltered and the items that were available before the war are still generally on sale in 1959. In March 1959 we therefore undertook to ascertain the cost of the 'human needs' diet proposed by the late Mr. Seebohm Rowntree in 1936, for a family with three children of school age. In the following we shall compare this figure of cost obtained by us with the cost of a modified 'human needs' diet, *viz.*, a diet that takes into account changes in the assessment of nutritional requirements and in dietary habits that have occurred since 1936. We shall further try to indicate the extent and the limitations of the practical applicability of such 'human needs' dietaries at the present time.

1. *A* 1956 *Diet at* 1959 *Prices*

Mr. Rowntree based his figure of cost of a 'human needs' diet on prices that obtained in London, in working-class districts. In March 1959, the diet suggested by him was bought by us in east London. The dietary and the figures of cost in 1936 and 1959 are shown in Table I. Twenty of the thirty-one items included in Mr. Rowntree's dietary were purchased by us in one shop—the branch of a large chain-grocer's business.[1] The items, all of which were of unexceptionable quality, are marked in Table I with an asterisk. The remaining eleven items were purchased in the neighbourhood, within a short walking distance of this shop. In the autumn of 1936, the weekly cost of the diet amounted to 21s. 10d.; in March 1959, its cost was found to be 71s. 6d. The London figure of cost was counterchecked in Oxford, by means of prices of foods of about comparable quality, charged in the centre of the city and in and near the open market. Herrings, kippers, eggs, syrup, and potatoes, were found to be slightly dearer in Oxford than in London, but the cheapest tea sold in March in Oxford at 9d. for 4 oz. and fat boiling bacon at from 10d. to 1s. 4d. a lb. With these adjustments, the total cost of the diet was actually slightly less in Oxford than in London. It must, however, be pointed out that—unlike the very low priced bacon in Oxford—the bacon sold in London at 1s. 9d. a lb. consisted to a substantial extent of lean meat, and that the tea costing 1s. 3d. a quarter pound in

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[1] With several hundred branches, mainly in London and in the Home Counties.

TABLE I

1936 '*Human Needs*' *Diet for Family with* 3 *Children*
(*Per Week*)

	Quantity	*Prices*			*Cost*	
		Price Unit	*Price per Unit* 1936	*Price per Unit* 1959	1936	1959
			s. d.	*s. d.*	*s. d.*	*s. d.*
*Breast of Mutton	2 ℔ 8 oz.	℔	7	6	1 5½	1 3
Minced Beef ...	2 ℔	℔	8	2 8	1 4	5 4
*Shin of Beef ...	1 ℔ 8 oz.	℔	8	3 2	1 0	4 9
Liver (ox)... ...	1 ℔	℔	10	2 8	10	2 8
*Beef Sausages ...	1 ℔	℔	6	2 2	6	2 2
*Bacon	1 ℔ 8 oz.	℔	11	1 9	1 4½	2 7½
Herrings	1 ℔ 8 oz.	℔	3½	1 1	5¼	1 7½
Kippers	1 ℔	℔	4	1 7	4	1 7
*Cheese	1 ℔	℔	9	3 2	9	3 2
*Skimmed Milk ...	14 pt.[1]	pt. equiv.[1]	1¾	5½	2 0	6 6½
*Egg	1 egg	egg	1	2½	1	2½
*Margarine... ...	1 ℔ 8 oz.	℔	5	1 4	7½	2 0
Dripping	1 ℔	℔	5	1 3	5	1 3
Suet	4 oz.	℔	8	10	2	2½
Bread[2]	19 ℔ 4 oz.	1¾ ℔	3¾	11	3 5	10 1
*Flour	4 ℔	3 ℔	5[3]	1 5½	7	1 11½
*Oatmeal	2 ℔	℔℔	3	8½	6	1 5
*Rice	10 oz.	℔	3	10	2	6¼
*Other Cereal[4] ...	6 oz.	℔	3[5]	8½[5]	1¼	3¼
*Peas (dried) ...	8 oz.	℔	3	1 0	1½	6
*Lentils	12 oz.	℔	4	1 6	3	1 1½
*Sugar	2 ℔	2 ℔	4½	1 3	4½	1 3
*Syrup	1 ℔	2 ℔	6	1 9	3	10½
*Marmalade ...	1 ℔	℔	6	1 0	6	1 0
*Figs (cooking) ...	8 oz.	℔	3	1 4	1½	8
*Cocoa	4 oz.	¼ ℔	2½	1 1½	2½	1 1½
*Tea	8 oz.	℔	1 6	5 0	9	2 6
Potatoes	14 ℔	7 ℔	5¼	2 2	10½	4 4
Swedes	6 ℔	2 ℔	1½	6	4½	1 6
Onions	4 ℔ 8 oz.	℔	1	5	4½	1 10½
Apples (cooking)	4 ℔	℔	1½	5	6	1 8
Extras[6]	—	—	—	—	1 0½[7]	3 5¼[7]
Total Cost of Weekly Diet ...					21 10	71 6

* All the foods marked with an asterisk (*) were obtained on the same day and in the same shop.

[1] Skimmed condensed milk diluted to the consistency of fresh milk.

[2] Purchased in 4 ℔ loaves in 1936 and in 1¾ ℔ loaves in 1959.

[3] 2s. per stone.

[4] Barley, semolina, tapioca, etc.

[5] Average price.

[6] Including extra vegetables.

[7] 4.8 per cent of total cost of diet.

London had a fuller flavour than the tea available in Oxford at three-fifths of this price. Moreover, both the number of shops from which the purchases were made and the area covered in making the purchases were larger in Oxford than in London.

The prices from which these figures of cost of a 'human needs' diet derive are admittedly low prices; but—as will be seen from the list of lowest prices encountered by us in March-April 1959 (Table II)—many of them

TABLE II

Lowest Prices Encountered in March–April 1959

	Price Unit	*Price per Unit*		*Price Unit*	*Price per Unit*
		s. d.			s. d.
Beef, thin rib	lb	1 4	Bread	1¾ lb	11
do. boiling (boneless) ...	lb	3 2	Flour, plain ...	3 lb	1 5
do., roasting (with bones) ...	lb	2 10	do. self raising ...	3 lb	1 6
do., lean minced	lb	2 6	Oatmeal, medium	lb	7½
Mutton, breast...	lb	4	Rolled Oats ...	lb	9½
do., scrag end	lb	8	Rice	lb	9
do., middle neck	lb	10	do., ground ...	lb	8
Pork, belly	lb	2 4	do., flaked ...	lb	7½
do., head[1]	lb	8	Semolina	lb	7½
Bacon, fat boiling	lb	8	Pearl Barley ...	lb	7
do., rashers	lb	2 2	Peas, yellow split...	lb	11
Beef Sausages	lb	1 8	Harricot Beans ...	lb	10
Herrings	lb	1 0	Lentils	lb	1 4
Kippers	lb	1 6	Sugar	2 lb	1 2½
Cheese, Cheddar type ...	lb	3 0	Golden Syrup ...	2 lb	1 9
do., Dutch Edam	lb	2 8	Jam (mixed fruit)	lb	1 0
Milk, skimmed cond.	1⅞ pt. equiv.[2]	10½	Marmalade ...	lb	10½
do., full cream, evaporated	2 pt. equiv.[2]	1 1½	Figs, cooking ...	lb	1 2
Eggs in shell	dozen	2 6	Prunes	lb	1 7
Margarine	lb	1 4	Tea	¼ lb	9
Lard	lb	1 4	Carrots and Swedes	lb	3
Dripping	lb	1 0	Onions	lb	4½
Beef Fat, raw minced... ...	lb	4	Apples (cooking) ...	lb	3

[1] Sold as half a head (weight approximately 3¾ lb).
[2] Contents of 1 tin diluted to the consistency of fresh milk.

are not minimum prices. No realistic figure of total cost could, however, be obtained by means of these minimum prices in Table II; for these prices were collected from eight different towns.[1] Indeed, although a reasonable estimate can be made of the rise in the total cost of the 1936 ' human needs ' diet, no valid index can be computed to show the rise in the prices of the individual foods that compose the dietary. For the price structure of many inexpensive foods at present is wholly amorphous, and the differences obtaining not only from district to district but even from shop to shop are often so wide that for some items to specify average prices would be well-nigh meaningless. That this is so does not, however, invalidate the comparability of figures of total cost of a ' human needs ' diet, so long as such figures of cost faithfully represent in each instance the outlay required for the purchase of the diet in the whole area surveyed, in spite of prevailing differences in the prices of specific foods.

Steady employment and the general rise in working-class standards of living since before the war have made many of the cheap basic foods—*i.e.*, the essential items in a nutritionally satisfactory diet at a very low cost—of much less practical importance than they had in many pre-war dietaries, and what once were main items in the food shops have thus become often mere sidelines, from both the sellers' and the customers' point of view.

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[1] Oxford, London, High Wycombe, Abingdon, Banbury, Birmingham, Slough, Reading.

Variations in the prices of these foods have little effect on the total pattern of demand for them; but they are by no means rare, for various reasons. The main difference in prices seems to occur between pre-packed branded and shop-packed foods, even when differences in quality are almost or completely non-existent. There are also often noticeable differences between the prices charged by small and those charged by large traders, and even between the prices charged by the branches of different chain businesses catering for identical types of customers. This is particularly marked with respect to dry groceries. Well established relatively low prices for certain basic items guarantee the large chain grocer a steady turnover of stocks, which for him is an important consideration. The small grocer has usually no great interest in the sale of many of these foods, because the demand for them which he is called upon to meet is unimportant in any case. Yet the small as well as the large trader may decide on sudden temporary reductions in his prices of foods in this category, distinctly below the prices demanded in nearby shops, as a useful form of advertisement.

Occasionally a food is sold exceptionally cheap because it represents a quasi by-product of more expensive foods and, by the shop in question, is considered an encumbrance. This, for instance, appears to be often the case with respect to pieces of fat bacon and also of fat and somewhat gristly meat, such as breast of mutton. From the data in Tables I and II it will be noted that imported breast of mutton could be obtained in 1959 at less than the price ascertained for it by Mr. Rowntree in 1936, doubtless because the demand for it is now too small to absorb promptly these cuts at a higher price. The dislike of most housewives of all meat with a proportion of visible fat accounts for the present absurdly wide range of meat prices, which is out of keeping not only with the nutritional values of the different cuts but also with their respective culinary values.

The prices of greengroceries also were found to differ widely, and occasionally—even within the space of a ten minutes' walk—price differentials of up to 25 per cent were encountered in the prices of carrots, swedes, greens, and potatoes.

2. *A Post-War 'Human Needs' Diet*

Mr. Rowntree's pre-war 'human needs' diet cost 3¼ times as much in the spring of 1959 as it did in the autumn of 1936. But nutritional and dietetic standards have changed, and the unmodified 1936 diet would not nowadays be regarded satisfactory for a family with three growing children. In particular, more than 14 pints of skimmed milk per week are now usually considered essential for such a family for nutritional reasons, and present-day dietary habits demand for a family of five persons more than one egg per week. Account is taken of such changes in outlook in the dietary presented in Table III. This adjusted 'human needs' dietary is identical with our previous dietary in this series, for the autumn of 1958[1], except that 2 lb. of

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[1] *Cf.*, T. Schulz, *A 'Human Needs' Diet: Autumn 1958.* BULLETIN Vol. 21 No. 1.

TABLE III

Spring 1959 'Human Needs' Diet for Family with 3 Children
(Per Week)

	Quantity	*Price per Unit*[1]	*Cost*
		s. d.	s. d.
Meat	4 lb	2 4	9 4
Bacon	1 lb	2 6	2 6
Herrings	1 lb 8 oz.	1 3	1 10½
Eggs	12 eggs	3	3 0
Cheese	1 lb 10 oz.	3 2	5 1¾
Fresh Milk	14 pt.	8½	9 11
Skimmed cond. Milk	7½ pt.	11	3 8
Margarine	2 lb 8 oz.	1 6	3 9
Dripping	1 lb	1 4	1 4
Bread	19 lb 4 oz.	11½	10 6½
Flour	3 lb	1 7	1 7
Rolled Oats	2 lb 8 oz.	10	2 1
Macaroni	1 lb	1 0	1 0
Other Cereals	1 lb 12 oz.	10	1 5½
Dried Legumes[2]	2 lb 8 oz.	1 1¼	2 9
Sugar	2 lb 8 oz.	7½	1 6¾
Jam	8 oz.	1 2	7
Syrup	8 oz.	11½[3]	5¾
Potatoes	10 lb 8 oz.	4½	3 11¼
Onions	1 lb	6	6
Other Root Vegetables	7 lb	4	2 4
Cabbage	3 lb 8 oz.	6	1 9
Cooking Apples	1 lb	6	6
Tea	8 oz.	4 8	2 4
Other Foods and Condiments	—	3 1¼	3 1½
School Milk	5 pt.	free	
Total Cost of Weekly Diet			77 0

[1] The price unit is, for eggs, one egg; for fresh milk, one pint; for skimmed condensed milk, a tin supplying the equivalent of 1⅞ pt. of fresh skimmed milk and approximately 5 oz. of sugar; for bread, a 1¾ lb loaf; for flour, a 3 lb. bag; for all other foods, a lb.

[2] Haricot beans, peas, and lentils in proportion of 2:2:1.

[3] Bought in 2 lb tin.

cooking apples have been replaced by 8 oz. of syrup. Cheap cooking apples of a good quality were still to be had in many places in the spring of 1959, although they naturally were less plentiful than they had been in the previous autumn. It will be seen that while the 1936 diet could be bought in the spring of 1959 for 71s. 6d., the modified diet, for a family of the same size and structure,[1] required an outlay of 77s. At this outlay it could be obtained in all the districts surveyed (*i.e.*, in the seven South Midland towns and in London). In some places it was actually a little cheaper. At 77s., the diet was 3s. 1d. dearer than the similar diet in the autumn of 1958, bought in the same districts and largely in the same shops and markets. The rise in cost was due mainly to the rise in the price of cheese and to seasonal rises in the prices of potatoes and vegetables.

However, even at 3s. 2d. a lb., cheese is an inexpensive and—particularly for families with children—very valuable food, as will be seen from the data

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[1] *Viz.* husband, wife, and three children aged between 5 and 12 years.

TABLE IV

Nutritional Values of 'Human Needs' Foods

	Price			*Nutrients Obtained for One Shilling Outlay*[1]		
	Price Unit	*Price per Unit*		*Calories*	*Protein*	*Calcium*
		s.	d.		gm.	mgm.
1. Meat	℔	2	4	450	30	20
2. Bacon	℔	2	6	830	15	20
3. Herrings	℔	1	3	380	40	230
4. Eggs	egg		3	310	25	120
5. Cheese	℔	3	2	590	35	1,160
6.* Fresh Milk	pt.		8½	480	25	960
7. Cond. Milk, skimmed	1⅞ pt.[2]		11	1,140	40	1,430
8.* Margarine	℔	1	6	2,330	—	—
9. Dripping	℔	1	4	3,040	—	—
10. Bread	1¾ ℔		11½	2,070	70	880
11. Flour	3 ℔	1	7	3,000	100	1,240
12. Rolled Oats	℔		10	2,130	65	310
13. Macaroni	℔	1	0	1,540	50	110
14. Other Cereals[3]	℔		10	1,840	45	100
15. Dried Legumes[4]	℔	1	1¼	1,160	95	410
16. Sugar	2 ℔	1	3	2,770	—	—
17. Jam	℔	1	2	970	—	40
18. Potatoes	℔		4½	680	15	90
19. Onions	℔		6	190	10	260
20.* Carrots	℔		4	260	10	550
21.* Swedes	℔		4	220	10	500
22.* Cabbage	℔		6	160	10	420
23. Cooking Apples	℔		6	250	5	30

* The foods marked with an asterisk (*) are especially important sources of vitamins A and C in a 'human needs' diet.

[1] In round figures.

[2] Fresh milk equivalent of 1 tin of condensed skimmed milk.

[3] Half rice and half semolina.

[4] Peas, beans, and lentils in proportion of 2:2:1.

in Table IV. Outlay for outlay, it provides considerably more nutrients than milk costing 8½d. a pint and, with herrings and skimmed condensed milk, is one of the cheapest animal protein foods. But full cream milk could be obtained in many places at less than 8½d. a pint. Some dairies supplied pasteurized but not tuberculin-tested milk[1] at 8d. a pint; furthermore, high quality full cream milk could be bought in the form of evaporated milk, usually at 1s. 2d. a tin representing the equivalent of 2 pints of fresh milk; some small grocery shops charged 1s. 4d. for a tin.

Table IV gives some general idea of the cost of nutrients supplied by foods all of which would be classed as inexpensive. The data of nutritional values are shown in round figures, since for practical purposes greater precision would be misleading; the nutritional composition of apparently identical foods can differ very considerably.

The relatively low nutritional values in Table IV for cabbage, carrots, and swedes, however, put the nutritional importance of these vegetables in false perspective; they are, in fact, indispensable in the ' human needs ' diets outlined in this paper, as the main sources of essential vitamins. Table IV, which specifies calories, protein, and calcium, makes no reference to vitamins; but as the bulk of vitamins A and C is supplied by relatively few foods, these can easily be indicated. Any normally varied diet will assure a sufficient intake of most minerals—especially iron—and of the vitamins of the B group.

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[1] Not only the cheapest but also the most expensive bottled milk—*viz.*, the milk from Jersey cows—is not generally tuberculin-tested.

There are obviously very wide variations in the amounts of nutrients that can be bought for a given outlay, even if this outlay is confined to those foods which have a legitimate place in a ' human needs ' diet. Nevertheless, all these foods—or adequate substitutes—are necessary not only for the sake of palatability but also in order to make sure of a complete nutrition. The fuel for the human body—fat and carbohydrates—can be bought at a very low cost; but the body also needs a mixture of various proteins, including those supplied essentially by foods derived from animals, to build up and maintain its tissues; and in order to utilize properly what is eaten and to keep the body in good health, vitamins and minerals are required which come from a variety of sources—some inexpensive and some less so. In short, an adequate balanced nutrition is assured only through the consumption of a reasonably varied mixed diet. But into such a diet can enter with advantage a number of meatless dishes and, when potatoes are scarce and dear, dishes in which potatoes are either supplemented or replaced by cereal foods, such as flour, rice, macaroni, or even bread. For potatoes are basically a carbohydrate food. From Christmas onward, the vitamin C content of potatoes harvested in the autumn, diminishes rapidly; moreover, this vitamin is often almost completely lost in the process of cooking and serving the potatoes. The substitution of cereal foods for potatoes will certainly entail no loss of essential nutrients if at the same time the intake of other fresh vegetables is slightly increased. Some of the most economical dishes require more preparation than a meal consisting essentially of meat and potatoes; they can, however, be both palatable and wholesome.

3. *Conclusion*

We have shown that the weekly cost of the pre-war ' human needs ' diet proposed by the late Mr. Seebohm Rowntree in 1936, for a family with three children, had increased from the autumn of 1936 to the spring of 1959, from 21s. 10d. to 71s. 6d. A modified post-war ' human needs ' diet, which allows for changes since 1936 in the assessment of nutritional and dietetic requirements, was found in March-April 1959 to be about 7¾ per cent dearer than the unmodified 1936 diet.

The modified diet, costing 77s. per week, as well as the unmodified diet only include foods that were generally available, in shoping districts of the eight towns covered by this survey. At 77s., the modified diet could be bought in all these districts, in spite of the often considerable differences in the prices of specific foods; a certain amount of selective and adaptable buying was, however, necessary to obtain it at this outlay. Moreover, only a housewife able to plan her menus in accordance with the daily changes in the supplies offered, and catering with a certain amount of imagination and for a family with no prejudice against moderately fat meat and meatless dishes, can hope to transform the nutritionally adequate ' human needs ' dietaries into actual diets that will assure that the intake of nutrients of each member of the family is indeed satisfactory in practice.

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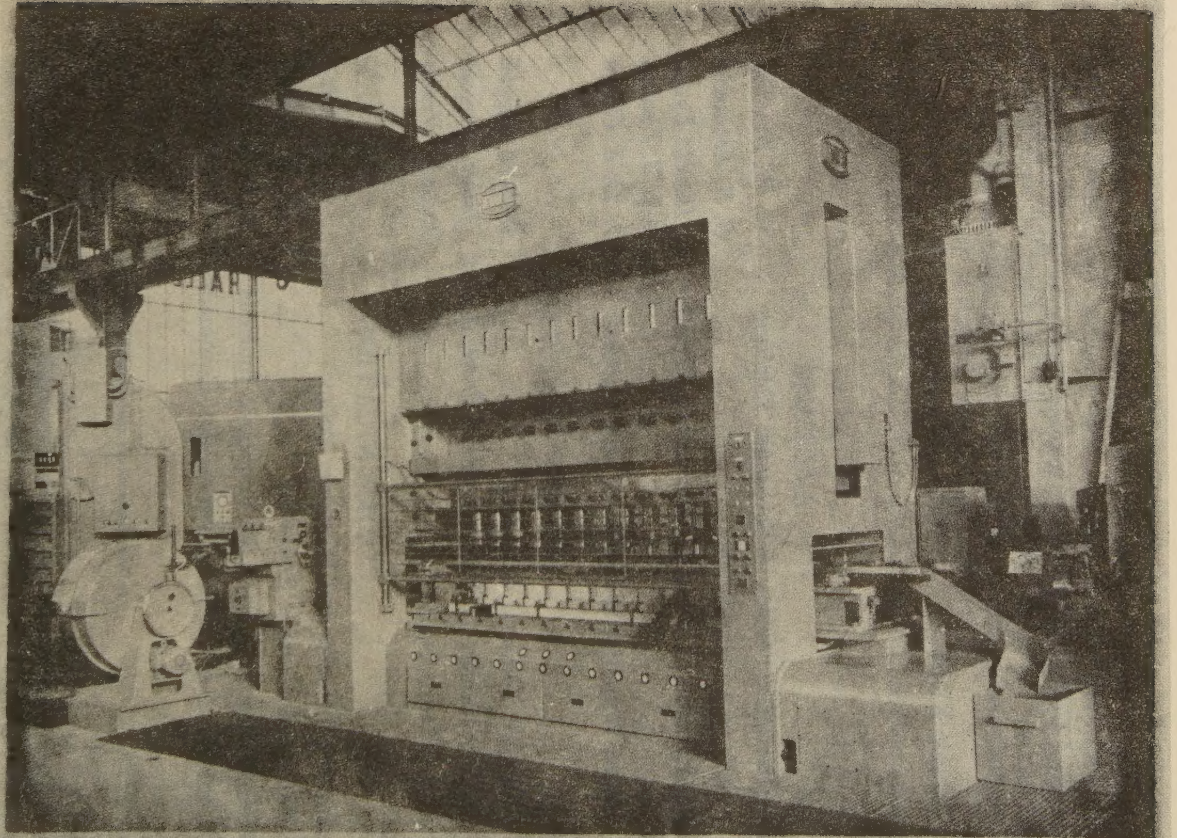

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